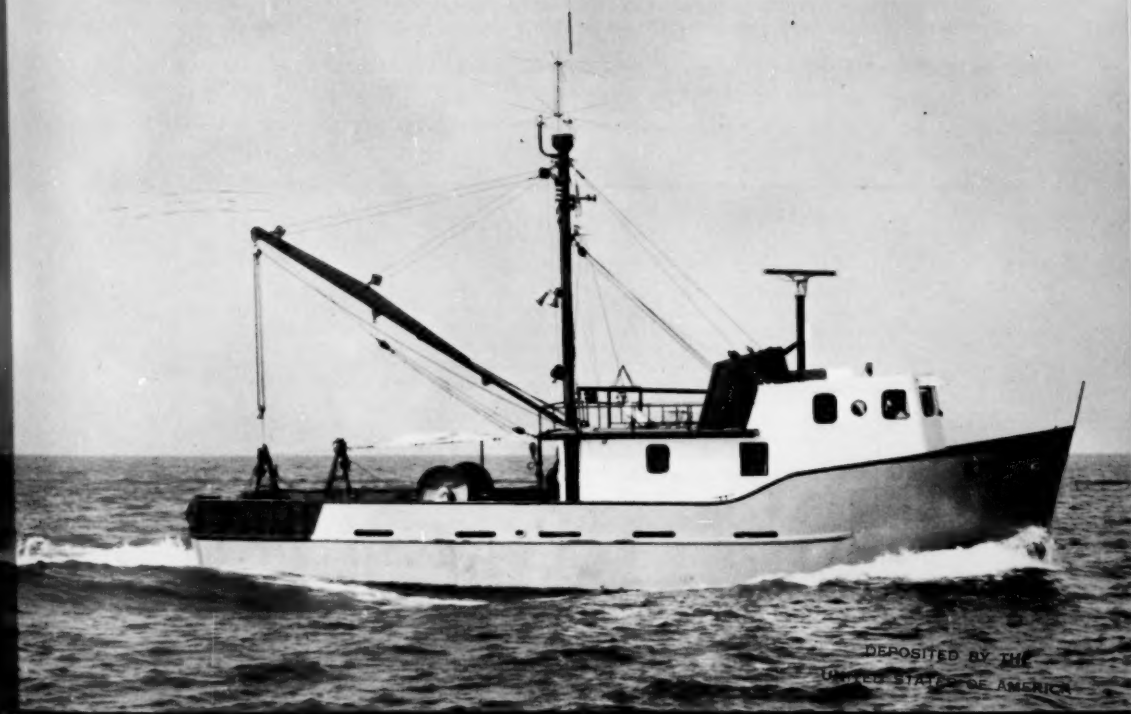


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COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
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CONTENTS

COVER: The M/V Kaho, exploratory fishing and gear research vessel used in Great Lakes trawling studies by the U. S. Bureau of Commercial Fisheries. Her home port is Saugatuck, Mich. Explorations in the Great Lakes have demonstrated that bottom trawling is an efficient method of harvesting unutilized species such as alewife and smelt which occur in great abundance in certain lakes. (See p. 1 this issue.)

Page		Page	
1	.. Trawl Cod-End Mesh Size Selectivity Toward Yellow Perch in Lake Erie, by Norman J. Reigle, Jr.		
6	.. Skipjack Tuna (<u>Katsuwonus pelamis</u>) Resources of the Trust Territory of the Pacific Islands, by Brian J. Rothschild		
<hr/>			
Page	TRENDS AND DEVELOPMENTS:	Page	TRENDS AND DEVELOPMENTS (Contd.):
	Fishing Vessel and Gear Developments:		California (Contd.):
9	.. Equipment Note No. 18--A Nekton Ring Net Sampler for Use Aboard Oceanographic Research Vessels, by J. B. Rivers	15	.. Marine Sport Fish Survey off South California Continued
	Alaska:	16	.. Cans--Shipments for Fishery Products, January-September 1965
12	.. Foreign Fishing Activity off Alaska, November 1965		Crab:
12	.. King Crab Fishery Trends, November 1965	16	.. Pacific Northwest Coastal Fishing Season Opened December 1, 1965
13	.. Trawl That Sorts Shrimp and Fish to be Tested		Federal Aid for Sport Fish and Wildlife Restoration:
	Alaska Fishery Investigations:	16	.. Interior Department Apportions Additional Funds for Fiscal Year 1966
13	.. Salmon Research		Fisheries Laboratory:
	California:	17	.. New Tropical Atlantic Biological Laboratory at Miami
13	.. Experimental Anchovy Fishery Approved		Great Lakes:
14	.. Abalone Observations and Growth Studies	17	.. Michigan's Plans for Rebuilding Sport and Commercial Fishery
15	.. Abundance of Dungeness Crab Surveyed Prior to Open Season		

Contents continued page II.

CONTENTS (CONTINUED)

Page	TRENDS AND DEVELOPMENTS (Contd.):	Page	TRENDS AND DEVELOPMENTS (Contd.):
	Great Lakes (Contd.):		Salmon:
18 ..	Michigan Receives Supply of Northwest Silver Salmon Eggs for Planting Program	35 ..	U. S. Pacific Coast Canned Stocks, December 1, 1965
	Great Lakes Fisheries Explorations and Gear Development:		South Atlantic Fisheries Explorations and Gear Development:
18 ..	Gear Research for Great Lakes and Inland Fisheries, November 1965	36 ..	Royal-Red Shrimp Grounds off Florida Coast Surveyed
	Great Lakes Fishery Investigations:		Texas:
19 ..	Biological Research and Sea Lamprey Control, November 1965	37 ..	Fishery Landings, 1964
	Gulf Fishery Investigations:		Tuna:
19 ..	Shrimp Distribution Studies	38 ..	U. S. Pacific Coast Albacore Fishing Season for 1965 Ends
	Hawaii:	39 ..	Record Size Albacore Caught off Hawaii
20 ..	Fishery Landings, 1964		U. S. Fishing Vessels:
	Industrial Fishery Products:	39 ..	Fisheries Loan Fund and Other Financial Aid for Vessels, October 1-December 31, 1965
20 ..	U. S. Fish Meal and Solubles:		U. S. Foreign Trade:
	Production and Imports, January-October 1965	40 ..	Imports of Canned Tuna in Brine Under Quota
21 ..	U. S. Fish Meal, Oil, and Solubles:		Washington:
	Production, October 1965	40 ..	Change Proposed in Legal Definition of Commercial Salmon Trolling Gear
21 ..	Production by Areas, November 1965	41 ..	Sport Salmon Fishermen Barred from Commercial Fishery
21 ..	U. S. Marine Oil Supply Situation and Foreign Trade, October 1964-September 1965 with Comparisons	41 ..	Landings of Fish and Shellfish, 1963-1964
21 ..	Swine Grow Faster When Fish Meal is Added to Diet		Wholesale Prices:
	Inland Fisheries Explorations and Gear Development:	42 ..	Edible Fish and Shellfish, December 1965
22 ..	Oahe Reservoir Trawling Studies		FOREIGN:
	Maine Sardines:		International:
23 ..	Canned Stocks, November 1, 1965	44 ..	Codex Alimentarius Commission:
	Menhaden:		Third Session Meets in Rome, October 19-29, 1965
23 ..	Review of U. S. Menhaden Industry, 1965		Nutrition:
	Michigan:	45 ..	Seventh International Congress of Nutrition to Meet in Hamburg
24 ..	New Station for Warm-Water Fish Research Planned		Cod:
	Nautical Charts:	45 ..	France Holds International Conference on Cod Industry
25 ..	Lists for Atlantic and Gulf Coastal Waters		European Trade Fairs:
	New York:	45 ..	American Fishery Products Promoted
25 ..	New Site to be Acquired for New York City Wholesale Fish Market		European Free Trade Association:
	North Atlantic:	46 ..	Industrial Tariffs Reduced Another 10 Percent
25 ..	Soviet Fishing Activity off Coast, December 1965		Fish Meal:
	North Pacific Fisheries Explorations and Gear Development:	46 ..	Production and Exports for Selected Countries, January-September 1965
26 ..	Hake and Anchovy Population Survey	47 ..	World Production, September 1965 with Comparisons
27 ..	Pelagic Fishing Gear Research		Marine Oils:
	Oceanography:	47 ..	World Production and Export Forecast for 1966 with Comparisons
29 ..	Marine Engineering Experiment Station Proposed by Southern New England Group		Food and Agriculture Organization:
29 ..	New Institute for Oceanography Set Up Within U. S. Department of Commerce	47 ..	Expansion in Fisheries Work Recommended at Conference
31 ..	Sea Spider Set in Atlantic to Serve as Stable Oceanographic Buoy	47 ..	Cuban Proposal on Fishing Rejected at Conference
32 ..	Boundary Between Arctic and North Atlantic Oceans Surveyed by U. S. Coast Guard Cutter <u>Evergreen</u>		Great Lakes:
	Oregon:	48 ..	Fishery Problems in the Great Lakes
32 ..	Changes in Fishery Regulations Adopted by Fish Commission		Oceanography:
33 ..	New Salmon Fishway Completed for Columbia River System	49 ..	Biological Oceanographic Section Set Up within the International Union of Biological Sciences
34 ..	Landings of Fish and Shellfish, 1963-1964		Aden:
	Oysters:	50 ..	New Steel Purse-Seiner Leads the Way to Modernization
34 ..	Supplemental Feeding of Oysters Tested		

Contents continued page III.

CONTENTS (CONTINUED)

Page	FOREIGN (Contd.):	Page	FOREIGN (Contd.):
	Argentina:		Japan (Contd.):
51 ..	Joint Japanese-Argentine Tuna Enterprise	63 ..	Canned Tuna Pack, 1964
	Australia:	63 ..	Firm to Market Chunk-Style Canned Tuna in Oil in Japan
51 ..	Fishery Export Trends, July-September 1965	63 ..	Tuna Packers and Exporters Fail to Negotiate New Export Agreement for Canned Tuna in Brine
	Brazil:	64 ..	Tuna Federation Launches Promotion on Canned Albacore Tuna in Oil
52 ..	Changes in Fisheries Code Proposed	64 ..	Skipjack Tuna Pole-and-Line Fishing in Eastern Atlantic Reported Excellent
52 ..	National Commission for Oceanography Established	64 ..	Large Number of Atlantic Tuna Vessels Return
	Bulgaria:	65 ..	Tuna Bait Production Trends
52 ..	Trawlers to be Built for Domestic and Soviet Fisheries	65 ..	Purse Seiner to Test Fish for Tuna in Caroline Islands Waters
	Canada:	65 ..	New Tuna Trolling Gear Developed
52 ..	Federal Government to Assist Fishermen for Catch Failure	66 ..	Tuna Fishing Company Tries to Cut Labor Costs
53 ..	Federal Department of Fisheries Sets up New Conservation and Protection Service	66 ..	Crab Meat Exports, October 1965
53 ..	Government Sponsors New Community Fish Processing Centers in Newfoundland	66 ..	Exports of Canned King Crab to U. S. Decline
53 ..	Atlantic Offshore Fishing Vessel Conference	66 ..	Canned Shrimp Exports, October 1965
54 ..	British Columbia Canned Salmon Pack, 1960-1965	67 ..	Frozen Swordfish Export Validations to the U. S. and Canada, April-October 1965
54 ..	Amendment of Licensing System for Commercial Fisheries in British Columbia Planned	67 ..	Exports of Frozen Rainbow Trout, October 1965
55 ..	British Columbia Herring Fishery Labor Dispute Settled	67 ..	Exports of Marine Products, July 1965
55 ..	Ontario's Fishery Research Program on Lake Erie	68 ..	Firm to Import Shrimp from Thailand
56 ..	Industrial Products Production, Use, and Foreign Trade, August 1964-July 1965 with Comparisons	68 ..	Fishery Landings in Selected Areas, June 1965
	Colombia:	68 ..	Landings and Utilization of Fishery and Other Marine Products, April 1965
56 ..	Japan-Colombia Joint Tuna Enterprise Proposed	69 ..	Japanese Views on Fisheries Agreement with South Korea
	Denmark:	70 ..	Proposed Technical Cooperation Agreement with Soviets
56 ..	Exports of Fishery Products and Byproducts, January-September 1965	71 ..	Major Firms Plan Expansion of Minced Fish Operation
	Ecuador:	71 ..	Industrial Products Production, Use, and Foreign Trade 1964-1965 and Forecast 1966
57 ..	Japan-Ecuador Tuna Enterprise Planned	72 ..	Fisheries Agency to Ask Tighter Regulation of Cultured Pearl Industry
58 ..	Fishing Fleet Status, 1964	73 ..	Composition of Distant Water Tuna Fleet
	France:	73 ..	Tuna Federation Charters Oil Tanker to Refuel Vessels at Sea
58 ..	Tuna Ex-Vessel Prices and Import Quotas Set for West African 1965/1966 Season	73 ..	Applications for Distant-Water Trawl Fishery
	East Germany:	73 ..	Firm Purchases Cargo Vessel for King Crab Factoryship
59 ..	Atlantik-Class Freezer Trawlers Being Built for U.S.S.R.	74 ..	Whaling Operations Affected by Labor Dispute
	Greenland:		Republic of Korea:
59 ..	Salmon Fishery Trends, January-November 1965	74 ..	Five Tuna Vessels Ordered from West Germany
	Iceland:		Mauritania:
60 ..	Export Stocks of Principal Fishery Products, October 31, 1965	74 ..	Fish-Processing Complex to be Built by Spain
60 ..	Herring Landings and Export Trends, Late 1965		Morocco:
	Japan:	75 ..	Tuna Fishery Expansion Tried
61 ..	Frozen Tuna Exports to U. S. and Puerto Rico, October 1965	75 ..	Tangier Cannery Short of Raw Tuna for Canning
61 ..	Export Validations of Fresh and Frozen Tuna and Tuna Lions, April-October 1965	76 ..	Lobster Fishery Investment Opportunity
62 ..	Tuna Market Trends, December 1965	76 ..	Export Markets Sought for Fish Protein Concentrate
62 ..	Frozen Tuna Export Price Trends, November 1965		Netherlands West Indies:
62 ..	Government and Tuna Industry Hold Fifth Meeting	76 ..	Fisheries Trends as of June 1965

Contents continued page IV.

CONTENTS (CONTINUED)

Page	
	FOREIGN (Contd.):
	New Zealand:
77 ..	Spiny Lobster Production, January-April 1965
	Nigeria:
78 ..	Frozen Fish Landings by Foreign Trawlers Increase
	Norway:
78 ..	Export Sales of Frozen Fish by Cooperative Group at Record Level
79 ..	Canned Fish Exports, January 1-July 24, 1965
79 ..	Whale Oil Output During 1965/66 Antarctic Season Sold in Advance
	Peru:
79 ..	Fish Meal Industry Trends, November-December 1965
	Philippine Republic:
79 ..	Fish Farm Development Program to be Financed by Australian Group
	Rumania:
80 ..	Atlantic Trawling Operations Shifted to West African Coast
	South Africa Republic:
80 ..	Fisheries Trends, August-September 1965
80 ..	Foreign Fishing Operations off West Coast, November 1965
81 ..	Spiny Lobster Transport <u>Gillian Gaggins</u> Delivered for Fishery in Tristan da Cunha Islands
81 ..	Fisheries Exhibition in October 1966 Planned
	Republic of Togo:
82 ..	Fisheries Trends, 1964-65
	Tunisia:
82 ..	Fisheries Development Aided by Swedish Loans
	U.S.S.R.:
83 ..	Soviets Plan 50-Percent Increase in Fishery Landings by 1970
83 ..	Freezer-Trawler <u>Zapoliarnyj</u> Delivered to Soviets by Danish Shipyard
84 ..	Japan Launches Fifth in Series of Factory-ships for Soviets

Page	
	FOREIGN (Contd.):
	Japan (Contd.):
84 ..	Antarctic Whaling Plans for 1965/66 Season
	United Arab Republic:
84 ..	Soviet-Egyptian Fishing Agreement Signed
	United Kingdom:
84 ..	Shrimp Fishing Venture in Persian Gulf Supported by Mothership
85 ..	Plaice Rearing Experiment Points Up Problems of Marine Fish Farming
85 ..	Freezer-Trawler <u>Othello</u> Launched for Hull Firm
	FEDERAL ACTIONS:
	Department of Commerce:
	Economic Development Administration:
87 ..	Federal Funds to Aid Lake Superior Commercial Fishing Industry
87 ..	Study Approved to Help Expand Louisiana Crayfish Industry
	Department of the Interior:
	Commercial Fisheries Research and Development Act:
88 ..	Federal Aid Authorized for Hurricane Damage to Louisiana Oyster Fishery
	Fish and Wildlife Service:
	Bureau of Commercial Fisheries:
88 ..	Revised U. S. Standards for Frozen Raw Breaded Shrimp--Requirements for Condition of Coating Still Being Evaluated
89 ..	Applications for Fishing Vessel Loans
89 ..	Hearings on Applications for Fishing Vessel Construction Differential Subsidy
	U. S. Tariff Commission:
90 ..	Comments Invited on Import Duties for Canned Clams
90 ..	Eighty-Ninth Congress (Second Session)
	RECENT FISHERY PUBLICATIONS:
92 ..	Fish and Wildlife Service Publications
94 ..	Miscellaneous Publications



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TRAWL COD-END MESH SIZE SELECTIVITY TOWARD YELLOW PERCH IN LAKE ERIE

By Norman J. Reigle, Jr.*

ABSTRACT

Rapid decline of the more popular food fish from the Great Lakes has prompted the introduction and use of gear designed for more efficient, economical, and year-round methods of harvest. Yellow perch, now one of the most valuable food fish of the Great Lakes, can be caught by the bottom trawl at certain times and localities.

In some Great Lakes states fishermen are allowed to harvest yellow perch with trawls. Other states do not permit trawling for yellow perch partially because of lack of knowledge concerning the biological effects of trawling on yellow perch stocks. This study sheds some light on the problem of protecting sublegal-sized perch through trawl cod-end mesh size control. An analysis of data collected by the U. S. Bureau of Commercial Fisheries research vessel *Kaho* during two cruises in Lake Erie in 1962 and 1963 indicates a cod-end mesh size of 24 inches stretched measure is satisfactory for the efficient harvest of yellow perch. With this size mesh only 19 percent (by number) of all yellow perch caught were under 8 inches (total length) and a profitable catch rate of larger fish was maintained.

INTRODUCTION

Due to the recent decline in stocks of the more popular food fish, i.e., yellow pike or walleye, blue pike, lake trout, and whitefish, in the Great Lakes, the value and demand for yellow perch (*Perca flavescens* Mitchell) have increased. Before the choice species declined, practically all fishing was done with gill nets, trap nets, pound nets, and haul seines. When fish were plentiful those gear produced periodic market gluts and low prices.

Recent efforts to improve the competitive and economic status of the fishing industry have included improvements in catching methods, processing equipment, cold-storage techniques, and consumer education. The extension and stabilization of production seasons and reduction of production costs are of equal importance in this endeavor. During the course of routine U. S. Bureau of Commercial Fisheries exploratory fishing activities and the development of new animal food fisheries, it has become obvious that the otter trawl is effective not only in taking of alewife, chub, and smelt, but also at certain times and places is of considerable value in catching yellow perch.

To understand the benefits and disadvantages of otter trawling in the Great Lakes,

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Fig. 1 - "Trousers leg" cod end being taken aboard the R/V *Kaho* in Lake Erie.

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Sep. No. 752

careful studies by species, area, and net design are desired by scientists, conservationists, and commercial fishermen. Trawl-mesh selectivity studies are an important step in this direction.

The introduction of the trawl into the Great Lakes did not occur until the late 1950's, however, and very little has been accomplished or published about the influence of various trawl characteristics in taking fresh-water fish. Numerous variables affect catch rate and success of bottom trawls. A number of noteworthy studies of these factors have been conducted in the ocean fishery (Taylor 1953; Clark 1963). One of the factors involved is species and size selectivity of different cod-end mesh sizes. Ferguson and Regier (1963) determined most desirable cod-end mesh size to obtain a high percentage of select market-size smelt in Lake Erie.

There is currently no size limit on yellow perch in the waters of the Great Lakes in Ontario, New York, or Pennsylvania. Indiana and Ohio have a size limit of 8 inches, and Michigan's legal size is $8\frac{1}{2}$ inches. In Wisconsin the size limit is 8 inches except in Green Bay where it is $7\frac{1}{2}$ inches. The legal sizes in those states correspond closely to the practical market size, and therefore identify the need to determine cod-end mesh sizes that will effectively screen out most of the individuals under those sizes (i.e., under about 8 inches).

In 1962 and 1963 strong year-classes of yellow perch were present in Lake Erie (U. S. Fish and Wildlife Service 1964). Records were kept of the size distribution of yellow perch for all catches during 2 of the 3 cruises by the Bureau of Commercial Fisheries research vessel Kaho in Lake Erie in those years.

During the second cruise (R/V Kaho Cruise 4) from September 23 to October 10, 1962, 62 trawl drags were completed and during the third cruise (R/V Kaho Cruise 11) from May 22 to June 20, 1963, 113 drags were completed. Although specific yellow perch studies were not a primary objective of those cruises, a great deal of basic information was amassed and four days were devoted entirely to special studies of mesh selectivity on yellow perch.

METHODS



Fig. 2 - "Trouser leg" cod end with catch.

During R/V Kaho Cruise 4, two days (October 6-7, 1962) were devoted to studying the influence of three cod-end mesh sizes on size selectivity of yellow perch. For this purpose, a "trouser leg" cod end was used as a means of fishing two cod ends with different mesh sizes simultaneously on one net (figs. 2 and 3).

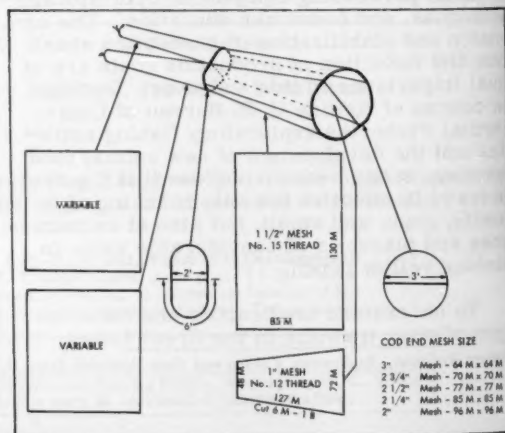


Fig. 3 - Construction of the "trouser leg" cod end, M=Mesh number.

The "trouser leg" was attached to a standard 52-foot (headrope) Gulf of Mexico-type fish trawl. Seven drags were completed; 3 comparing mesh sizes of $2\frac{1}{2}$ and $2\frac{3}{4}$ inches, and 4 comparing mesh sizes of $2\frac{1}{4}$ and $2\frac{3}{4}$ inches¹ (table 1). All drags were between Cleveland and Fairport, Ohio, at a depth of 13-14 fathoms.

On June 17 to 19, 1963, during R/V Kaho Cruise No. 11, size selectivity studies using the "trouser leg" cod end were continued off Avon Point, Ohio, at a depth of $10\frac{1}{2}$ to 11 fathoms. Four mesh sizes, 2, $2\frac{1}{4}$, $2\frac{1}{2}$, and 3 inches, were compared (table 2). On 2 drags, mesh sizes of 2 and $2\frac{1}{2}$ inches were paired; 2 drags paired mesh sizes of $2\frac{1}{4}$ and $2\frac{1}{2}$ inches; and 1 drag had mesh sizes of $2\frac{1}{2}$ and 3 inches paired. In addition, 3 drags were made in which both legs of the cod end were of $2\frac{1}{2}$ -inch mesh.

Table 1 - Summary of Yellow Perch Catches Taken in Paired Tows Using "Trouser Leg" Cod Ends during R/V Kaho Cruise 4

Number of Drags	Cod-End Mesh Size	30-Minute Drag	Fish		Percentage 8" or Longer
			Under 8"	Over 8"	
3	Inches $2\frac{1}{2}$ with $2\frac{3}{4}$	Lbs. 12	No. 14	No. 98	% 88
		5	2	45	96
4	$2\frac{1}{4}$ with $2\frac{3}{4}$	22	150	220	59
		9	15	91	86

Table 2 - Summary of Yellow Perch Catches Taken in Paired Tows Using "Trouser Leg"-Type Cod Ends during R/V Kaho Cruise 11

Number of Drags	Cod-End Mesh Size	30-Minute Drag	Fish		Percentage 8" or Longer
			Under 8"	Over 8"	
2	Inches 2 with $2\frac{1}{2}$	Lbs. 113	No. 69	No. 60	% 47
		62	28	138	83
2	$2\frac{1}{4}$ with $2\frac{1}{2}$	93	40	82	67
		55	30	84	74
3	$2\frac{1}{2}$ with $2\frac{3}{4}$	29	34	136	80
		65	37	138	79
1	$2\frac{1}{2}$ with 3	37	8	46	85
		6	-	11	100

In the 1962 studies, direction of drags was kept constant (west and WNW.). In 1963, the directions and alternate tows were reversed (north and south) with the exception of the $2\frac{1}{4}$ - and $2\frac{1}{2}$ -inch study where drags were N. and WNW. A constant engine speed of 1,100 r.p.m. produced a towing speed of about 3 m.p.h. With the exception of two drags of one-hour duration, all drags were 30 minutes long and all catch rates are equated to 30 minutes.

In addition to these special studies, the yellow perch taken with the standard assessment trawl (which used a one-inch mesh liner in the cod end) were

separated and placed into two size categories: (1) small--less than 8 inches, and (2) large--8 inches and over (figs. 4 and 5). Only data for drags which contained 10 pounds or more of



Fig. 4 - A sorted trawl catch taken in Lake Erie using a one-inch-mesh cod end. Legal-size (8-inch) yellow perch are in the tub in the left foreground and sublegal perch are in the tub on the right. In the box in the background is a bucket of smelt, a mixed lot of trout-perch and spottail shiners (center), two suckers, and young-of-the-year yellow perch (right).



Fig. 5 - Measuring yellow perch taken in selectivity studies.

¹All cod ends were cotton material and premanufactured to the specific sizes. All measurements used in this report are stretched measure of the dry material.

yellow perch were considered for analysis. A total of 85 drags was made. Drags were made at depths ranging from 4 to 19 fathoms in the eastern, central, and western basins. All the 1962 drags used a standard 52-foot (headrope) trawl; while in the 1963 studies, 50-, 52-, and 61-foot trawls were used. All tows were of 30 minutes duration and vessel speed was about 3 m.p.h.

RESULTS

The results of the two-year study with a one-inch-mesh liner in the cod end are summarized in table 3. Although the proportionate distribution of drags in various basins were

Table 3 - Summary of Yellow Perch Selectivity Study Results Obtained on R/V *Kaho* Cruises 4 and 11 with One-Inch-Mesh Liner in Cod End

Basin	Drags	Total Quantity	Per Drag	Fish 8" or Longer	Percentage 8" or Longer
	No.	Lbs.	Lbs.	Lbs.	%
Cruise 4 - (September 23 to October 10, 1962)					
Western . . .	6	1,785	298	1,103	61.8
Central . . .	14	3,921	280	387	9.9
Eastern . . .	1	10	10	1	10.0
Subtotal . .	21	5,716	272	1,491	26.1
Cruise 11 - (May 22 to June 20, 1963)					
Western . . .	17	1,950	115	205	10.5
Central . . .	42	5,984	142	1,927	32.4
Eastern . . .	5	185	37	11	6.0
Subtotal . .	64	8,083	126	2,143	26.5
Total . . .	85	13,769	162	3,634	26.4

mesh sizes from 2 to 3 inches, and the catch of yellow perch over 8 inches increased from 47 percent to 100 percent over the same range (table 4). For comparisons of the "trouser leg" and the one-inch mesh data, it should be remembered that the catch was divided in half in the "trouser leg" trawl, and thus catches should be doubled for making comparisons. The catch per unit of effort in the "trouser leg" studies may also have been influenced by distortion of the cod-end entrance caused by the heavier catch accumulated in the small-mesh leg of the cod end.

similar for both years, over twice as many pounds of yellow perch per drag were obtained in 1962 than 1963. This decline agrees with the expectations shown by Lake Erie year-class strength data obtained by the Bureau's Biological Station at Sandusky, Ohio. Percentage of yellow perch longer than 8 inches was nearly identical in both years (26.1 percent in 1962 and 26.5 percent in 1963). The composite for both years was 162 pounds of yellow perch per drag of which 26.4 percent or 42 pounds were large fish

In the "trouser leg" cod-end studies the pounds of yellow perch per drag decreased from 113 to 6 in the range of

Table 4 - Summary of Yellow Perch Catches by the Varying from 2 Inches to 3 Inches

Mesh Size	Drags Used	Per 30-Minute Drag	Fish		Percentage 8" or Longer
			Under 8"	Over 8"	
Inches	No.	Lbs.	(No.)		%
2	2	113	69	60	47
2 $\frac{1}{4}$	8	57	190	302	61
2 $\frac{1}{2}$	16	44	151	640	81
2 $\frac{3}{4}$	7	7	17	136	89
3	1	6	-	11	100

DISCUSSION

Trawl catch variables were controlled as much as possible and these studies demonstrated a direct relationship between mesh size and size of yellow perch caught. This difference can be clearly shown by the trend to catch larger yellow perch as mesh size increases (fig. 6). All yellow perch taken in the three-inch mesh were longer than 8 $\frac{1}{2}$ inches long; but in the two-inch mesh, only 36 percent were over 8 $\frac{1}{2}$ inches and 35 percent were less than 7 inches long. The selectivity is also reflected in the smaller total catch per unit of effort as the mesh size increased (fig. 7). Selectivity was identical for both years and seasons (spring and fall) in all mesh sizes for which comparative data was available.

A cod-end mesh size of one inch was too small for efficient selective harvest of marketable yellow perch, since only 26 percent of all yellow perch caught with that size mesh were 8 inches or longer. The larger mesh sizes were effective in eliminating small yellow perch and smaller fish such as smelt, alewife, and gizzard shad from the catch. Total catches of all drags with a cod-end mesh size of less than 2 inches had 42 percent by weight of species

other than yellow perch; while in mesh sizes of over 2 inches, only 17 percent of other species (mostly gizzard shad) were present.

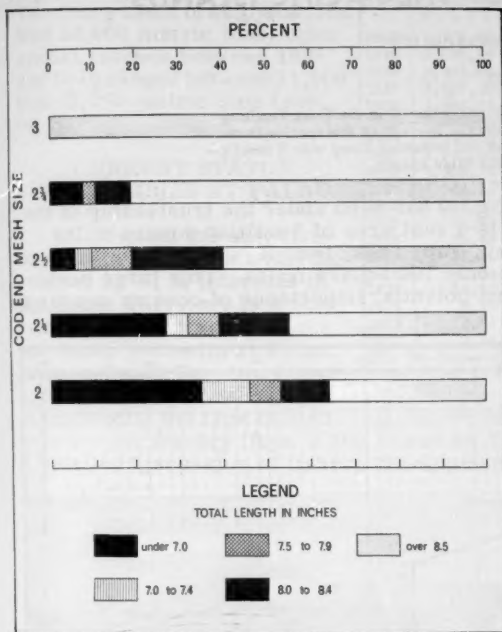


Fig. 6 - Size composition of yellow perch taken in various cod-end meshes. Percentage is based on total number of fish taken in all drags for each mesh size (stretched measure, inches).

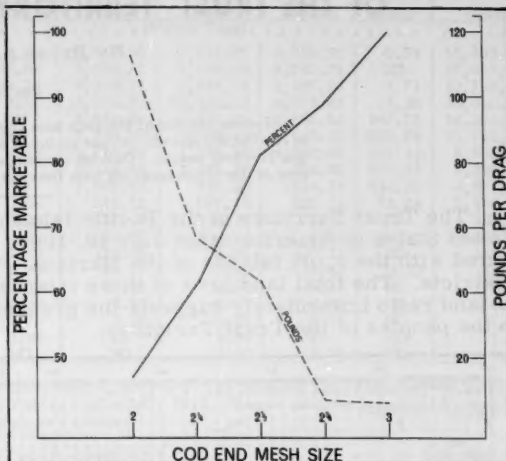


Fig. 7 - Percentage marketability (fish 8 inches and longer) and pounds of perch per thirty-minute drag for various mesh sizes. Catch-rate numbers represent only half of a divided catch in a "trouser leg" cod end.

Data from the present study indicates that the most efficient cod-end mesh size to harvest a high percentage of yellow perch 8-inches or longer, at a profitable catch rate, is 2 1/2 inches. With that size mesh, 81 percent (by number) of all yellow perch taken were over 8 inches in length and a profitable catch rate was maintained.

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Created in 1849, the Department of the Interior--a department of conservation--is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States--now and in the future.

SKIPJACK TUNA (*KATSUWONUS PELAMIS*) RESOURCES OF THE TRUST TERRITORY OF THE PACIFIC ISLANDS

By Brian J. Rothschild*

ABSTRACT

Prewar catches of skipjack tuna (*Katsuwonus pelamis*) in the Trust Territory of the Pacific Islands provide an index of potential harvests of this species from the Territory region. Data on prewar catches are presented along with a description of the recommencing tuna fisheries in the Palau Islands.

The Trust Territory of the Pacific Islands (fig. 1) has been under the trusteeship of the United States of America since July 18, 1947. It is a vast area of 3 million square miles dotted with the 2,100 islands of the Mariana, Palau, Yap, Truk, Ponape, and Marshall Islands Districts. The total land area of these islands is only 700 square miles. This large ocean-to-land ratio immediately suggests the present and potential importance of oceanic resources to the peoples of the Trust Territory.

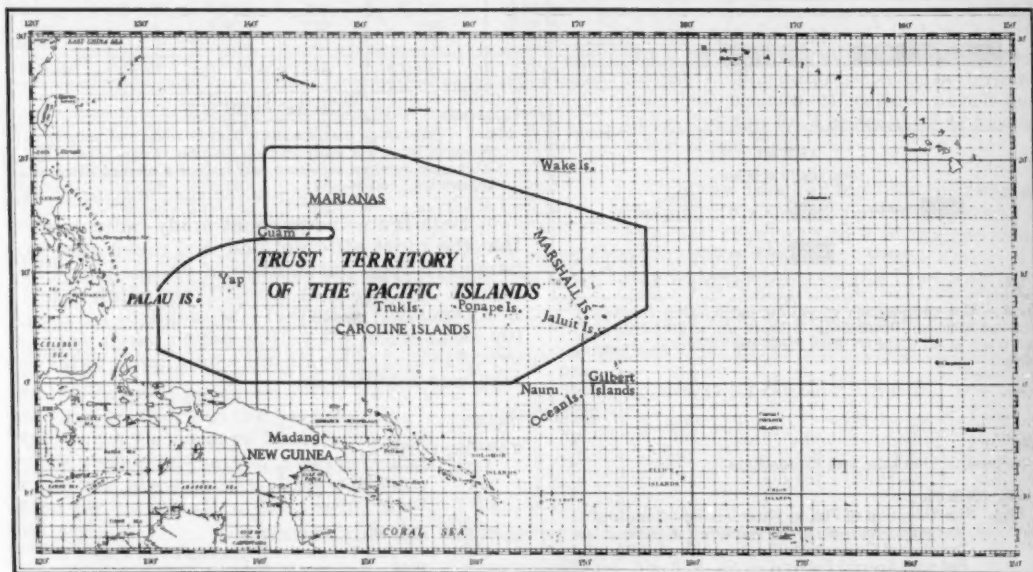


Fig. 1 - Trust Territory of the Pacific Islands.

HISTORICAL

Before the Second World War, the Trust Territory (then the Japanese-mandated islands) supported substantial fisheries for tuna which were not only taken in Trust Territory waters but also landed at its ports. The prewar fishery used pole-and-line gear for surface-swimming skipjack and long-line gear for the deep-swimming tuna, marlin, and shark. Commercial-scale tuna fishing was halted by the war. After the war long-line fishing was resumed, but the pole-and-line resources have not been harvested on a commercial scale until recently.

An index to the skipjack tuna potentials of the Trust Territory can be obtained from data on catches at maximum historical fishing intensities. Fishing intensity was highest prior to

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U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 753

the war by pole-and-line fishing. In 1937 the total Trust Territory catch of skipjack tuna was 33,000 metric tons; other annual catches between 1935 and 1940 ranged between 11,000 and 18,000 metric tons (see table).

CURRENT STATUS OF FISHERIES AT PALAU

At present the only fishery resource being actively developed by U. S. interests in the Trust Territory is a pole-and-line fishery for skipjack and small yellowfin at Palau. Here, a Trust Territory management biologist is engaged in improving the type of boat used for the fishery (figs. 2 and 3) and an American company has begun a fisheries operation. A detailed discussion of fishery development in the Palau Islands may be found in Wilson (1965).

Year	Saipan	Yap	Palau	Truk	Ponape	Jaluit	Total
				(Metric Tons)			
1940	3,379.05	3.64	6,047.38	7,217.09	1,586.30	0.51	18,233.97
1939	2,086.99	36.06	3,548.77	7,639.63	3,707.75	ND	17,019.20
1938	2,392.03	149.28	3,420.21	5,294.78	1,495.58	6.71	12,758.59
1937	2,697.30	ND	13,774.70	12,433.53	4,063.96	91.30	33,060.79
1936	1,696.01	ND	3,835.97	5,870.23	2,695.84	167.73	14,265.78
1935	1,785.98	ND	5,390.99	3,002.43	1,313.12	229.78	11,722.30
1934	2,516.00	4.19	3,778.65	1,199.98	1,202.46	255.13	8,956.41
1933	1,762.30	ND	2,144.46	1,883.36	926.85	172.43	6,889.40
1932	1,309.73	ND	1,592.33	810.26	534.18	614.76	4,861.26
1931	564.26	0.44	548.12	1,097.13	525.24	81.26	2,816.45
1930	258.00	0.90	157.06	913.39	6.38	ND	1,335.75
1929	24.69	0.89	228.90	214.50	0.53	ND	469.51
1928	26.49	1.13	131.45	4.50	0.15	ND	163.72
1927	28.11	0.73	14.77	7.50	1.62	0.22	52.95
1926	44.84	2.16	42.41	2.76	0.11	ND	92.28
1925	14.81	1.99	8.53	6.05	4.95	ND	36.33
1924	9.10	1.76	1.56	5.21	0.11	ND	17.74
1923	2.81	1.46	ND	3.04	ND	ND	7.31
1922	2.36	ND	ND	3.60	3.75	ND	9.71

ND: No data available.

Note: These data are taken from S. Shapiro's "The Japanese Tuna Fisheries," U.S. Fish and Wildlife Service Fishery Leaflet 297, 1948. Shapiro used the Statistical Yearbook of the South Sea Islands as a source.



Fig. 2 - A view of the Palau shipyard now operated by the Trust Territory government.



Fig. 3 - Interior view of Palau shipyard, showing keel members for a 75-foot Hawaiian-style tuna sampan being constructed under the direction of the Territory fishery management biologist.

Arrangements to begin the Palau Islands operation were made in 1963 when the Trust Territory administration signed an agreement with the Van Camp Sea Food Co., which enabled the company to locate a fleet and shoreside facility, including a 1,500-ton freezer-storage plant at Malakal Harbor in the Palau Islands (fig. 4). Actual fishing began in the summer of 1964 when the firm began receiving catches from six fishing vessels of the Okinawan type weighing 25 tons each. During the early months of the fishery, monthly catches of skipjack ranged between 200,000 and 750,000 pounds.

The vessels used in this fishery were built in Okinawa and are of a design typical of bait-fishing vessels used for tuna throughout the western Pacific Ocean (fig. 5). They are 65 feet long, not including the catwalk bow. The beam is 15 feet. Forward of the bridge are two bait-wells, four ice holds, and a fish hold. Each baitwell can contain 30 buckets of bait. The vessels are powered with 6-cylinder, 90-horsepower engines and have a maximum speed of about 7 knots. Each vessel is manned by 12 skilled Okinawans and 8 Micronesian trainees. When



Fig. 4 - View of fishery facilities at Malakal Harbor, Palau. The buildings in the foreground are fishermen's quarters. The freezing plant is the large building in the left background. Three of the fishing vessels are tied up at the dock.



Fig. 5 - One of the tuna vessels based at Palau. Pole-and-line gear and live bait are used to catch surface schools of skipjack and yellowfin tuna.

the Micronesians become more adept at fishing, they will eventually replace the Okinawans.

Several bait species are used in the fishery. A small anchovy-like fish appears to be the most important. The bait is taken at night with the aid of a light to attract the fish. The bait fish are held in floating bait receivers, which consist of netting supported by bamboo frames. When the fishing vessel is ready to proceed from the bait area to the fishing ground, the bait is loaded in the baitwells. On the fishing ground, fish schools are sighted by scouting for bird flocks or floating logs, both indicators of the presence of tuna schools.

Plans are under way to expand the Palauan fleet. Several companies are considering the establishment of fishing bases at sites of other active prewar skipjack fisheries such as Truk.

Note: The cooperation of Peter T. Wilson and various other officials of the Government of the Trust Territory of the Pacific Islands is sincerely appreciated. John Liversey, Trust Territory Public Information Officer, kindly supplied figures 2, 3, 4, and 5.

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THREE WHALE HEARTS WITH A COMBINED WEIGHT OF 1,200 POUNDS DONATED TO SCIENCE

A firm in Chicago, Ill., is using whale hearts in a research project aimed at analyzing cytochrome c, one of many proteins found in every cell of the body.

The firm had previously worked on the hearts of a number of subjects, ranging from man to moths, but had never studied whale hearts. So company scientists asked a Norwegian whaling fleet operator if he would donate about 160 pounds of heart muscle from a whale. Instead, the Norwegian presented them with eight times that much--three entire whale hearts with a combined weight of more than 1,200 pounds.

The Norwegian whaler, it seems, has a big heart, too. (Oil, Paint, and Drug Reporter, August 2, 1965.)

TRENDS AND DEVELOPMENTS

Fishing Vessel and Gear Developments

EQUIPMENT NOTE NO. 18--A NEKTON RING NET SAMPLER FOR USE ABOARD OCEANOGRAPHIC RESEARCH VESSELS:

Concerted efforts by marine scientists in the use and development of subsurface gear and techniques for sampling plankton while the research vessel is under way are of long standing. These efforts have not, however, solved the problem of sampling nekton in the surface layer of water from a moving vessel at sea. The valuable contribution that nekton provides to studies of marine resources has been recognized to the extent that routine sampling in the 1-meter surface layer has developed as an important phase of the exploratory fishing operation. Until recently, the primary tool used aboard exploratory fishing vessels to collect nekton specimens was the simple dip net. It was used when drifting during daytime or in conjunction with attraction lights when "laying to" at night and required the exclusive use of vessel time.

Described here is an effective, economical, and easily handled gear developed aboard the exploratory fishing vessels Silver Bay and Oregon of the U. S. Bureau of Commercial Fisheries for sampling nekton in the 1-meter surface layer of water from a moving vessel simultaneously with and without interference to other fishing activities.

The nekton ring net is designed to be used while the vessel is under way at reduced speed. It can be easily handled by one person with little or no interference with other shipboard activity. For this reason, except when the vessel is drifting or running at cruising speed, the nekton ring net may be operated round-the-clock.

The nekton ring net is essentially a circular net with a conical-shaped bag attached to a 1-meter-diameter steel ring and towed on a 3-leg bridle (fig. 1, see p. 10). The bag is constructed from four circular panels of con-

secutively graduating nylon netting of 2-; $\frac{1}{2}$ -; $\frac{1}{4}$ -; and $\frac{1}{16}$ -inch stretched mesh respectively. The steel meter ring is constructed of galvanized 1-inch-diameter stock and the 3-leg bridle is of $\frac{3}{16}$ -inch diameter, 3-strand, 1,050-

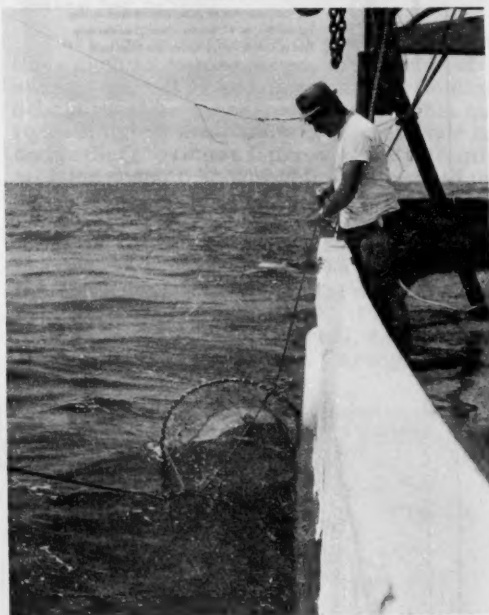


Fig. 2 - Pulling the retrieving line to bring the net to the side of the ship.

pound-test nylon rope. The bridle legs are 6 feet long, and each is spliced into a 3-inch (inside diameter) by $\frac{5}{16}$ -inch-stock-galvanized steel bridle tow ring. A $\frac{3}{16}$ -inch-diameter nylon tow line is attached to the bridle tow ring at one end and secured to a small boom extending out from the side of the vessel at the other end. Tow line length is var-

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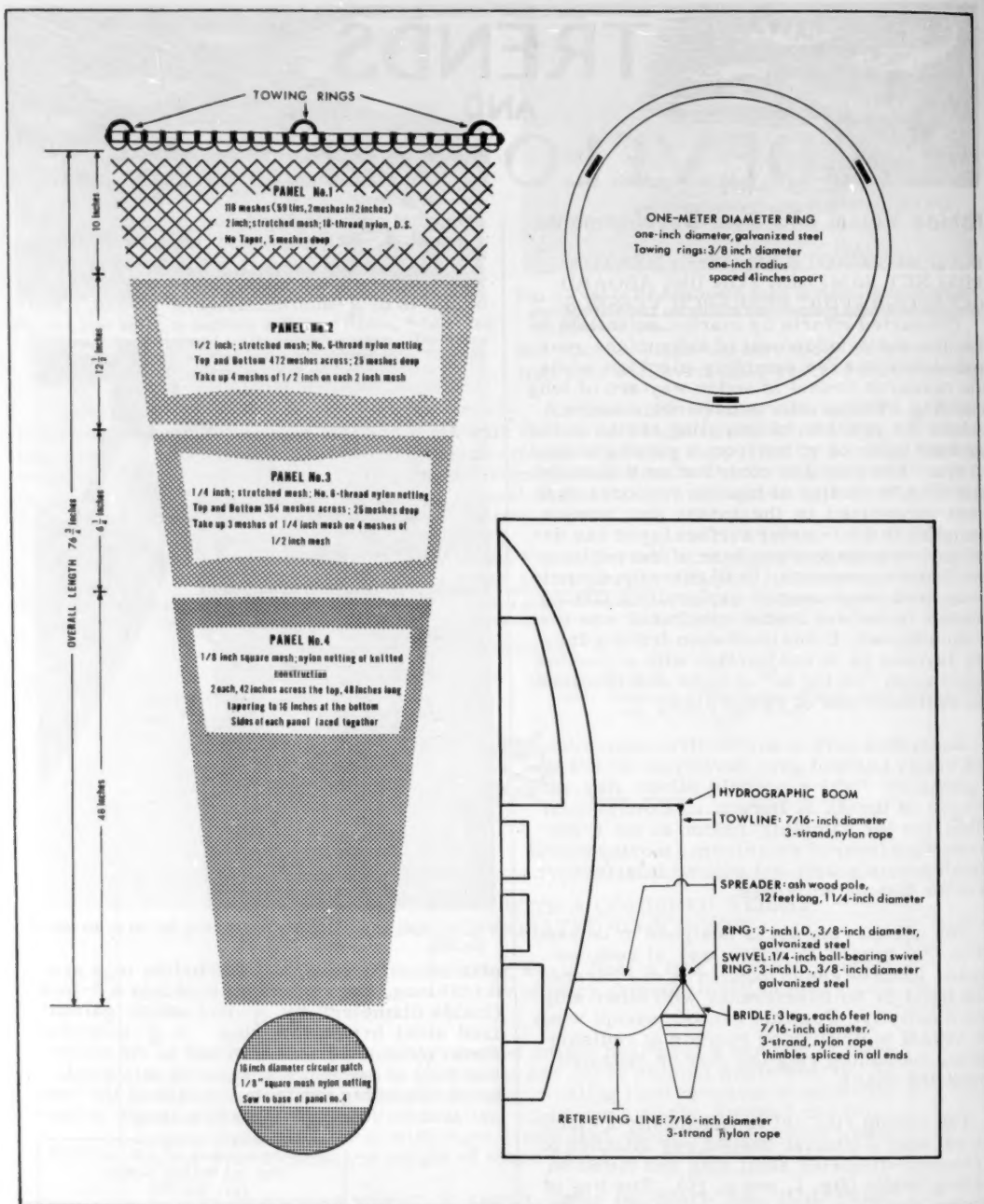


Fig. 1 - The specifications of the ring-net and associated gear.

table depending upon boom height and vessel speed. Boom length is also variable, although a minimum of about six feet is needed to keep the net away from the side of the hull and out of wake turbulence. A $\frac{1}{4}$ -inch (900-pound breaking strength) ball-bearing swivel is attached at the junction between the bridle and towline to prevent excessive kinking. For ease in handling, a $\frac{3}{16}$ -inch nylon retrieving line is attached from the top inboard section of the meter ring to the vessel rail. Thus by pulling the retrieving line (fig. 2), strain is released from the bridle and transferred to the side of the meter ring, making retrieval a simple 1-man operation.

Towing speeds in excess of four knots, particularly in a following sea, may cause the net to skip along the surface or jump completely out of water. This can be remedied by attaching a 20-pound weight to the bottom of the meter ring, with little or no adverse effect on the catches. When additional weight and stability are desired, a length of galvanized steel chain weighing approximately seven pounds may be attached to the towline in front of the bridle ring.

To keep the net away from the hull when using a short hydrographic boom as on the *Oregon*, a 12-foot, $1\frac{1}{2}$ -inch-diameter ash spreader pole (fig. 3) may be used.

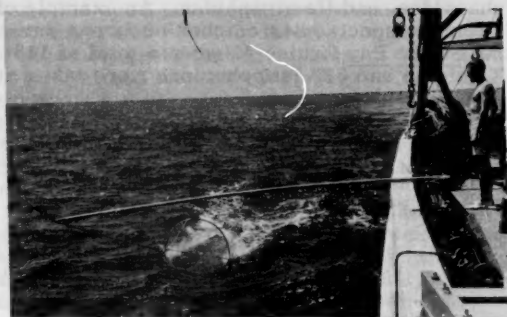


Fig. 3 - Nekton net in action, showing spreader pole keeping the net away from the vessel.

Care and observation of prevailing conditions such as towing speed, prevalence of sargassum weed, and presence of floating debris must be exercised to insure that quality specimens are obtained. Experience has shown that short tows (approximately 15 minutes long) and frequent retrieval tend to prevent damage to fragile specimens.

In the Gulf and South Atlantic operational area, the following groups have dominated the catches of the nekton ring net: Myctophidae, Xiphiidae, Istiophoridae, Pleuronectiformes, Synodontidae (larvae), Leptocephali, Excocitidae, Plectroganths, Carangidae, Cory-

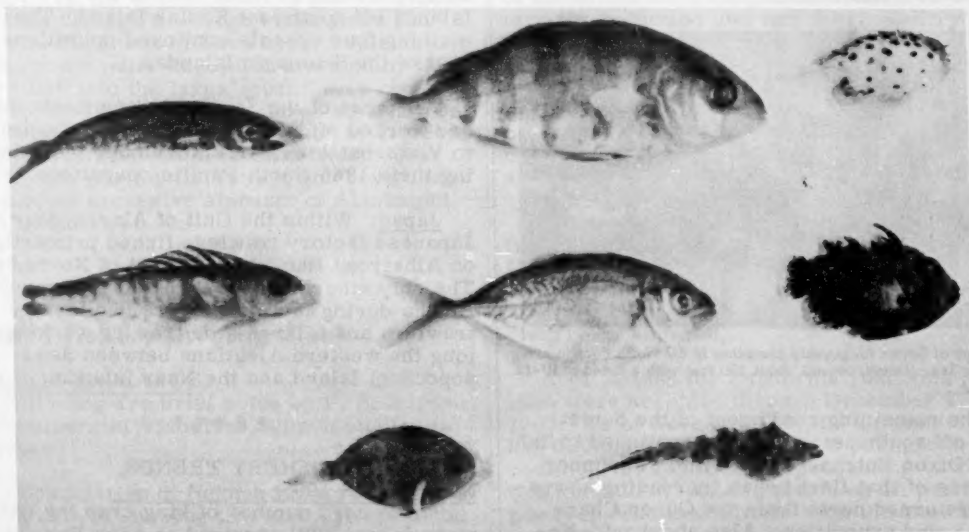


Fig. 4 - Typical components of the nekton taken in the nekton ring net.

phaenidae, and Hemirophidae. An example of the more spectacular catches occurred during Silver Bay Cruise 42 when a total of 113 Xiphidae and 385 Istiophoridae were taken at five stations.

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Alaska

FOREIGN FISHING ACTIVITY OFF ALASKA, NOVEMBER 1965:

U.S.S.R.: Early in November 1965, the fleet of about 70 Soviet vessels centered off southeast Alaska near Dixon Entrance was divided. About 50 of the Soviet vessels moved south and began fishing off central British Columbia in Queen Charlotte Sound north of Vancouver Island. They operated just outside Canada's newly established 12-mile fishing zone throughout most of November. Catches of the Soviet trawlers off Canada reportedly were composed of ocean perch, sole, and other bottomfish.



One type of Soviet factoryship operating in the North Pacific and Bering Sea. Length overall about 150 feet with a speed of 10-12 knots.

The remaining contingent of the Soviet fleet off southeastern Alaska continued to fish near Dixon Entrance and in mid-November the size of that fleet began increasing as vessels returned north from the Queen Charlotte Sound expedition. Also about mid-November the Soviet fleet off Dixon Entrance

began moving to the north. By month's end that fleet was operating on the Yakutat and Fairweather Grounds between Cape Spencer and Cape St. Elias, an area the Soviets fished heavily earlier in 1965. Following the apparent termination of the Queen Charlotte Sound expedition, the size of the Soviet fleet in the eastern Gulf of Alaska returned to about 70 vessels, including 55 trawlers (5 of which were BMRT factory trawlers), about 10 reefers, and a few support vessels.

Another Soviet fleet of about eight BMRT factory trawlers fished Portlock and Albatross Banks off Kodiak Island during most of November. Several of those vessels joined the fleet off Yakutat late in the month, leaving about five factory trawlers off Kodiak.

With the appearance of at least 10 BMRT factory trawlers in the Gulf of Alaska during November 1965, it was presumed that the Soviet fleet fishing for Pacific ocean perch in the central and western Aleutians was reduced to a total of about 15 factory trawlers, serviced intermittently by support vessels.

Increasing shrimp fishing efforts by the Soviets in the Gulf of Alaska during November 1965 involved at least eight SRT-M trawlers. During the latter part of the month the Soviet shrimp fleet was divided, with one group of four vessels moving to the proven shrimp fishing grounds east of the Trinity Islands off southwest Kodiak Island. The remaining four vessels continued operations east of the Shumagin Islands.

All three of the Soviet whaling fleets that had worked off Alaska reportedly returned to Vladivostok by early November, completing their 1965 North Pacific operations.

Japan: Within the Gulf of Alaska, four Japanese factory trawlers fished primarily on Albatross Bank during most of November. The only other Japanese vessels fishing off Alaska during the month were two factory trawlers and a large side trawler working along the western Aleutians between Semipodchnoi Island and the Near Islands.

KING CRAB FISHERY TRENDS, NOVEMBER 1965:

The record number of king crab tag returns (about 300) received at Auke Bay during November 1965 indicated that fishing

pressure in the Kodiak Island area is probably increasing. The 1965 king crab catch was expected to reach an all-time high of about 100 million pounds.

To insure high standards for the quality of king crab and to promote markets for king crab, the State of Alaska in 1965 set up an Alaskan King Crab Marketing and Quality Control Board. The Board's program for 1965 included a \$50,000 contract for the promotion of king crab by an advertising agency in Seattle, Wash. Additionally, the Board has under study the work on king crab quality control being done by the Alaska Department of Health and Welfare, the U. S. Bureau of Commercial Fisheries, and the National Canners Association.

TRAWL THAT SORTS SHRIMP AND FISH TO BE TESTED:

The U. S. Bureau of Commercial Fisheries exploratory Fishing and Gear Research Base at Juneau, Alaska, plans to build and test a 2-bag shrimp trawl. This shrimp trawl was first developed in France and was further modified in the Netherlands, according to the Dutch periodical *Visserij-Nieuws*. A unique feature of this trawl is an intermediate "sieve flap" which sorts out the shrimp from the fish catch. It seems that shrimp jump up on the water column when disturbed and leap through the large mesh sieve flap and into the small meshed upper cod end. Fish, on the other hand, are diverted by this sieve flap into the large-mesh lower cod end. The lower cod end can be closed or left open depending on whether a fish catch is desired. If it proves successful, such a trawl would aid Kodiak shrimp fishermen who have been plagued by excessive amounts of Alaska pollock in their catches.



Alaska Fishery Investigations

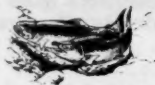
SALMON RESEARCH:

Following are brief notes on U. S. Bureau of Commercial Fisheries salmon studies in Alaska:

Compilation of Naknek Lake red salmon smolt data is showing that although age I and II smolts start migrating from the lake in May, the age II run is finished by late July,

while the age I outmigration continues into September and possibly later. Comparison of sizes suggests that in agreement with other red salmon races the fastest growing progeny from a given brood year in the Naknek system migrate as age I fish and the slower growing fish leave the following year at age II.

Data collected during hydraulic sampling of sockeye eggs in Grassy Point Creek were analyzed. Of the 7,096,000 eggs potentially available for deposition, an estimated 1,347,000 eggs (1,052,000 live and 295,000 dead eggs) were present in the gravel on October 8, 1965. Survival from potential to actual egg deposition was computed to be 15 percent. The comparable figure for 1964 was 11 percent. Spawner density and loss to bear predation were less in 1965 and probably accounted for the higher survival in 1965.



California

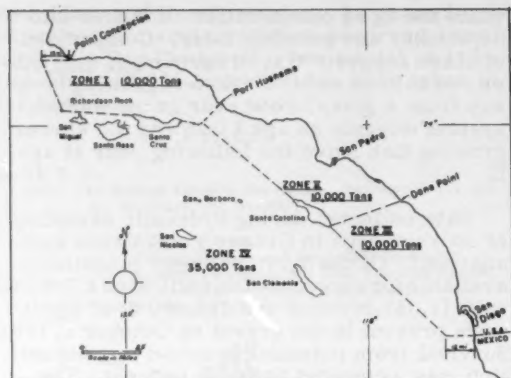
EXPERIMENTAL ANCHOVY FISHERY APPROVED:

In mid-November 1965, the California Fish and Game Commission approved regulations and permits for the controlled commercial catch in 1965/66 of not more than 75,000 tons of anchovies from California's offshore waters for reduction into fish meal, poultry feed, and other industrial products.

The maximum "take" of 75,000 tons will be cumulative for all permit holders in all prescribed areas through April 30, 1966, closing date of the authorized experimental season.

Commission regulations provide that the fishery may be terminated at any time the Commission finds that existing uses of anchovy--including live bait and forage uses--are jeopardized, or when the resource is clearly endangered.

Applications for California reduction permits were accepted through December 1, 1965. As of November 20, the Commission had authorized the granting of permits to 9 commercial applicants representing 12 reduction plants. Authorization on all permits, however, was conditioned upon the administrative approval of the California Department of Fish and Game.



Anchovy southern permit area.

In addition to the overall seasonal reduction limit of 75,000 tons of anchovies, the Commission regulations have established sub-limits within 5 defined "zones" in offshore waters.

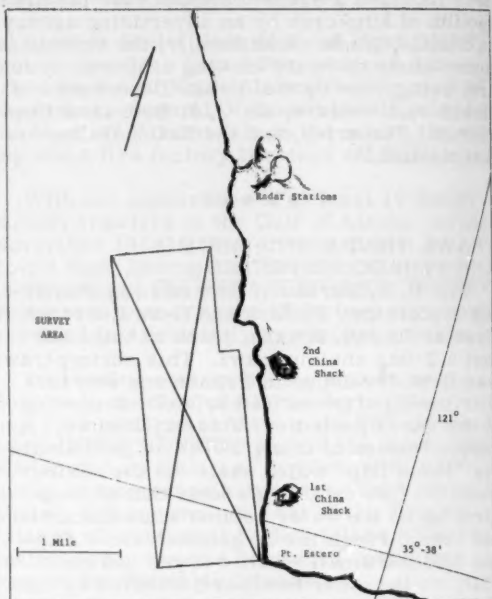
All waters north of Point Conception are included in a single-zone Northern Permit Area with a catch limit of 10,000 tons of anchovies for reduction. All bays and established live-bait areas are closed to commercial anchovy fishing.

The Southern Permit Area has been subdivided into 4 zones, with an overall limit of 65,000 tons of anchovies. Three of those zones, with limits of 10,000 tons each, lie shoreward of an irregular line drawn from Point Conception to Richardson Rock, to Santa Cruz Island, to Anacapa Island, to Catalina Island, and south to a point 12 miles seaward of the California-Mexico international boundary. Zone divisions within that section are defined by lines drawn seaward from Port Hueneme and from Dana Point. Closed areas within those 3 zones include all waters lying within 3 miles of the mainland shoreline, and within 3 miles of the leeward (east) side of Catalina Island.

The fourth zone in the Southern Permit Area, bearing a 35,000-ton limit, encompasses all waters beyond the outer boundary of the 3 shoreward zones. (California Department of Fish and Game, November 20, 1965.)

ABALONE OBSERVATIONS AND GROWTH STUDIES:

M/V "Mollusk" Cruise 65-M-2A-Abalone (September 13-27, 1965): The number and sizes of abalone in commercial fishing areas were estimated by random sampling methods during this cruise by the California Department of Fish and Game research vessel Mollusk. The coastal area from Pt. Estero to Cambria was where the vessel operated.



Survey area covered by M/V Mollusk Cruise 65-M-2A-Abalone, September 13-27, 1965.

During the cruise, 20 diving stations selected at random were occupied within two adjacent areas each $1 \times 1\frac{1}{2}$ miles. Three areas had been selected but adverse weather limited diving to 2 of the 3 areas. Station depths ranged from 20 to 66 feet. Dives averaged from 30 to 40 minutes for each station, covering a 1,500-square-foot area along a 290° transit line at each station (100 ft. long \times 15 ft. wide). All abalone that could be found within each station area were counted and measured.

Weather conditions were not good for diving, and a large swell and dirty water at the stations restricted observations in shallow water. Several dives were necessary at some stations before counts could be made. Aba-

lone were found on all but 7 of the 20 stations completed. Abalone may have been present at 2 other stations but because of a heavy swell and large amounts of sediment, observation was restricted.

The remaining 11 negative dives were over rocky areas in deep water where the bottom was predominantly sandy. Greatest concentrations were found in 40- to 60-foot depths. The greatest numbers of abalone found were in the 4- to 7 $\frac{3}{4}$ -inch size group. About 50 percent more of that size group was found than in the survey made in December 1964. But 30 percent fewer of the 0- to 4-inch group and 20 percent fewer of 7 $\frac{3}{4}$ -inch and larger abalone were found than in the 1964 survey.

Note: See Commercial Fisheries Review, March 1965 p. 25.

ABUNDANCE OF DUNGENESS CRAB SURVEYED PRIOR TO OPEN SEASON:

M/V "Nautilus" Cruise 65-N-2g (October 4-29, 1965): To determine preseason abundance and condition of legal and sublegal Dungeness crab (*Cancer magister*) in the San Francisco area for prediction of the 1965/66 season, the coastal waters off San Francisco from the Russian River to Point Montara were surveyed by the research vessel Nautilus of the California Department of Fish and Game. Another objective was to collect female crabs for fecundity and fertility studies.

Sampling stations during this cruise were selected randomly from the crab areas between Point Montara and the Russian River. Commercial crab traps were baited with squid and rockfish and allowed to fish overnight at each of the 70 stations visited. Ten of the stations were fished for 2 days due to vessel difficulties.

A total of 6,193 crabs was taken at 70 stations in 697 traps. The catch consisted of 2,521 legal males, 3,443 sublegal males, and 229 females. The average legal catch per trap of 3.62 crabs was higher than the 1964 catch of 2.78 but lower than the 1963 catch of 4.3.

Season	Legals No./Trap	Sublegals No./Trap	Predicted Catch Million Lbs.	Actual Seasonal Landings Lbs.
1965/66	3.6	4.9	0.8-1.4	-
1964/65	2.8	2.1	0.6-0.9	787,619
1963/64	4.3	2.9	1.1-1.6	1,158,157
1962/63	4.1	3.5	0.7-1.6	1,429,780
1961/62	3.2	5.1	1.5	710,350

The best catches (numbers of legal crabs per trap) in 1965 were made from Bodega Bay to the Russian River in 10-22 fathoms of water. Good catches were also made south of the San Francisco Lightship in 15-25 fathoms of water. On the basis of the survey, it was believed the catch for the 1965/66 season would be 1.1 million pounds, with estimates ranging from 800,000 to 1.4 million pounds.

The average sublegal catch of 4.9 during the 1965/66 preseason survey was the highest since 1961/62 but does not indicate a strong population according to past preseason surveys. In 1962, after the survey showed 5.1 sublegals per trap, 1,429,780 pounds were landed--far below the long-term average of 3.8 million pounds.

The crabs caught in 1965 were in good condition with only 5 percent soft, but many of the crabs in the San Francisco area were barnacled and had missing legs. At Bodega Bay the crabs were of excellent quality and good size. Fifteen females with eggs were collected for fecundity studies.

Note: See Commercial Fisheries Review, March 1965 p. 24.

MARINE SPORT FISH SURVEY

OFF SOUTH CALIFORNIA CONTINUED:

Airplane Survey Flight 65-14 (October 7 and 13, 1965): Two separate one-day flights were made in October 1965 as part of a marine sport fish survey to count the number of fishing poles being fished from the shoreline, and if possible, the number of people attending them. The southern California coastline from the Mexican Border to Jalama Beach State Park was the area surveyed by the aircraft Cessna "182" N9042T of the California Department of Fish and Game.

The counts will be used to augment estimates of sportfishing effort derived from the ground survey. The aerial counts provide data for (1) an independent estimate of total effort, and (2) the calculation of a conversion factor to be used in deriving estimates of effort in those areas not covered by the ground crews.

The coastline from the Mexican Border north to Santa Monica was surveyed for about 1 $\frac{1}{2}$ hours on the afternoon of October 7. The flight was terminated at Santa Monica because of low coastal fog. A total of 40 poles

attended by 40 fishermen was counted. Fishermen were well scattered in the area surveyed. The only notable concentration was in the Point Fermin-White Point area where 9 fishermen (22.5 percent) were observed.

On October 13 the coastline was flown in a little more than two hours from the Mexican Border north to Santa Barbara Harbor. Low coastal fog and haze prevented continuing beyond that point. The count was 56 poles and 55 fishermen. Almost 9 percent of the total (5 poles) were being fished outside of the area encompassed by the regular shoreline sampling plan. Fishermen were fairly well scattered except from La Costa State Beach to Oceanside where 11 fishermen (20 percent) were counted.

The flights further substantiated the fact that about 10 percent of the observed fishing activity in southern California was taking place outside the area encompassed by the preselected shoreline sampling plan.

Note: See Commercial Fisheries Review, December 1965 p. 22.



Cans--Shipments for Fishery Products, January-September 1965

A total of 2,324,148 base boxes of steel and aluminum was consumed to make cans shipped to fish and shellfish canning plants in January-September 1965 as compared with 2,215,974 base boxes used during the same period in 1964. In 1965, an increase in the U. S. canned pack of Maine sardines and Gulf shrimp was offset somewhat by some decline in the pack of canned tuna.



Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonnage figures for steel (tinplate) cans are derived by use of the factor 23.7 base boxes per short ton of steel.



Crab

PACIFIC NORTHWEST COASTAL FISHING SEASON OPENED DECEMBER 1, 1965:

The coastal commercial Dungeness crab fishing season in Oregon and Washington o-

pened December 1, 1965. The Washington fishery had been originally set to open a month later, but was rescheduled to coincide with the Oregon fishery. (Washington Department of Fisheries, November 23, 1965.)



Federal Aid for Sport Fish and Wildlife Restoration

INTERIOR DEPARTMENT APPORTIONS ADDITIONAL FUNDS FOR FISCAL YEAR 1966:

Distribution of more than \$11 million in Federal-aid funds for fish and wildlife restoration projects in the 50 States, Guam, the Virgin Islands, and the Commonwealth of Puerto Rico was made about the latter part of 1965, announced Secretary of the Interior Stewart L. Udall December 15, 1965. The distribution supplements \$15 million released on June 5, 1965, bringing the total to more than \$26 million. It completes the allocation for fiscal year 1966.

Of the total distribution, \$19,236,000 is for wildlife restoration and \$6,810,000 is for sport fishery projects. The money comes from excise taxes collected on sport fishing and hunting equipment.

The Interior Secretary said funds apportioned to the States will be used for fish and wildlife restoration projects involving the purchase of land, improvement of areas of land or water for fish and wildlife, and to conduct research for the restoration and perpetuation of those resources.

Under the Federal Aid program, the States initiate the projects and, if they meet the requirements established by the Department of the Interior, the funds allocated are used to reimburse the States up to 75 percent of the cost of completed projects.

The amount allocated for fiscal year 1966 under the Federal Aid in fish and wildlife restoration programs is \$2,286,000 more than the \$23,760,000 apportioned in fiscal year 1965.

Note: See Commercial Fisheries Review, August 1965 p. 34, March 1965 p. 28.



Fisheries Laboratory

NEW TROPICAL ATLANTIC BIOLOGICAL LABORATORY AT MIAMI:

A new Tropical Atlantic Biological Laboratory at Miami, Fla., operated by the Department of the Interior's Bureau of Commercial Fisheries, was dedicated on November 20, 1965. It is located at Virginia Key and is part of the world's largest tropical ocean science complex. The Virginia Key Campus of the Institute of Marine Science, University of Miami, was also dedicated at the same time. The new Federal Laboratory and the Marine Science Campus are on opposite sides of Rickenbacker Causeway in Biscayne Bay, a short distance from downtown Miami.

The new research installation at Miami is an expansion of the Bureau of Commercial Fisheries Biological Laboratory established in Washington, D. C., in 1958, and transferred to Miami in early 1965. The expanded facilities will enable the Bureau's laboratory personnel to continue investigations of the tropical and equatorial Atlantic. These include surveys on the distribution and abundance of surface schools of tuna and their availability to live-bait and purse-seining methods of fishing. Investigations also will be continued on variations in the physical, chemical, and biological environment that combine to produce concentrations of tuna schools.

The dedication of the Tropical Atlantic Biological Laboratory is the culmination of years of planning by the Bureau of Commercial Fisheries for the establishment of a laboratory devoted to the study of fishery-oceanography in the tropical Atlantic.



Great Lakes

MICHIGAN'S PLANS FOR REBUILDING SPORT AND COMMERCIAL FISHERY:

The Great Lakes have the potential of being the greatest sport and commercial freshwater fish-producing waters in the world, predicts the Fisheries Chief of the State of Michigan Conservation Department. He points out that Michigan, with control of 38,575 square miles of the Great Lakes, must assume a role of leadership in rebuilding the fishery in those waters.

The Michigan fisheries official stresses that "the major responsibility for whatever happens to the Great Lakes fishery must be ours." He said that the long rigorous campaign to control the sea lamprey and reestablish the lake trout in the Great Lakes is now foreseeable but that the alewife poses serious problems. The alewife is so numerous it has now become a threat to the survival of all species spawning within the Great Lakes. It accounts for over 90 percent of the quantity of all fish present in the Great Lakes and its numbers are expected to hold steady somewhere near that high level. Because of this, the Fisheries Chief says the time has come to question present objectives of management programs on the Great Lakes.

As the Fisheries Chief pointed out, this enormous potential of Great Lakes sport fishing is now being vigorously assailed by the alewife, helped by the remnant sea lamprey population, and that these problems should be approached by laying down new policies regarding recreational and commercial fishing. In considering some steps that can be taken, it was noted that the lake trout is well on its way to being re-established in Lake Superior. In Lake Michigan, however, it is doubtful that this species can successfully reproduce itself in face of predicted alewife populations. Recognizing this, and the fact that newly-returned lake trout will not spawn for 6 or 7 years, Michigan State fisheries personnel say restocking of the lakes with hatchery trout must be continued at the most rapid rate possible and that regulations must then be modified.

Another plan for improving Great Lakes sport fishing is to put all possible harvest pressure on the alewife. The best solution seems to promote sport fish that eat alewives. "If we can place a predator on the alewife that will be of interest to sport fishermen, we can promote sport fishing as well as help to solve the alewife question for commercial purposes," said the Fisheries Chief. Basically, this is the thinking in the Michigan Conservation Department's program to attempt establishing new species in the Great Lakes and its selection of the silver or coho salmon.

The Fisheries Chief said, "We have examined all facets relating to this fish, and now believe it an excellent choice for introduction to the Great Lakes. We think chances of success are extremely good. According to the Michigan Conservation Department,

silver salmon is comparatively cheap to raise and can be released in streams tributary to the Great Lakes at the size of 4 or 5 inches. It has a strong homing instinct; gives promise of a high return to good spawning streams where they will be planted. This species, together with others of importance such as the steelhead, brown trout, and brook trout, will be pushed by the State of Michigan toward maximum development in the Great Lakes. (Michigan Department of Conservation, Lansing, December 9, 1965.)

MICHIGAN RECEIVES SUPPLY OF NORTHWEST SILVER SALMON EGGS FOR PLANTING PROGRAM:

Nearly 2.5 million silver (coho) salmon eggs were delivered the latter part of 1965 to the State of Michigan from the Pacific Northwest for introduction of that species in the Great Lakes during the second phase of the Michigan Conservation Department's three-year planting program. The eggs were provided by the States of Oregon, Washington, and Alaska for the cost of shipping and are being held at the Thompson, Harrietta, and Oden State hatcheries in northern Michigan. They will be hatched and reared at those hatcheries for release in northern Great Lakes tributaries in spring 1967 when they will have matured enough to migrate downstream into the big waters. Based on the success in rearing Michigan's first batch in 1965, Michigan fisheries specialists estimate that about 1.5 million young fish will be produced from the latest supply of eggs. High hopes are held for the fish adapting to Michigan waters.

The 1.2 million eggs from Washington come from a particular strain which has been widely used in the Northwest to establish new runs of silver salmon. Another 1.2 million eggs from Oregon are also expected to take to Michigan waters with a good degree of success. Rounding out Michigan's potential planting stock for 1967 are 50,000 eggs of specially adaptable strains which were delivered from Alaska in early December 1965. By the time young fish from this total supply of eggs are ready for release, Michigan will have launched the first plantings under an all-out three-year effort to establish runs of adult silver salmon in Great Lakes streams.

Initial releases will be made in spring 1966 when 750,000 young silver salmon (5 to 6 inches long) will be put in the Platte River

near Honor in Benzie County, Bear Creek near Bear Lake in Manistee County, and the Big Huron River northeast of L'Anse in Baraga County. Those fish are expected to migrate downstream into Lakes Michigan and Superior, grow to maturity, and then return to spawn in the streams where they are to be planted. Some of the faster-growing planted fish will probably try migrating back to their release sites next fall.

The three northern streams to be stocked this spring will in 1967 receive most, if not all, of the fish to be raised from the 2.5 million eggs now in State hatcheries. Some of the young silver salmon may be planted in additional waters. Part of that decision will depend on how well this spring's planted fish show up in the three original streams during fall 1966. (*News Bulletin*, Michigan Department of Conservation, Lansing.)

Note: See *Commercial Fisheries Review*, January 1966 p. 32.



Great Lakes Fisheries Explorations and Gear Development

GEAR RESEARCH FOR GREAT LAKES AND INLAND FISHERIES, NOVEMBER 1965:

Highlights of Great Lakes and inland fisheries gear research and technical assistance by the U. S. Bureau of Commercial Fisheries Exploratory Fishing Base, Ann Arbor, Mich., during November 1965:

Oahe Reservoir Gear Research: The Oahe Reservoir field work for the 1965 season ended about mid-November when the Bureau's reservoir fishery research vessel Hiodon was taken from the water and placed in dry-dock near the Bureau's station. Trawling conducted near Mobridge before the haulout resulted in an average catch rate of 284 pounds per 15-minute drag. Carp accounted for 76 percent of the total November catch; the next principal species was sheepshead which accounted for only 6 percent.

Arkansas Farm-Pond Fish Gear Research: Several development and demonstration trials with the farm pond haul seine were carried out in November. The most noteworthy sets were: (1) in a 50-acre pond at Jonesboro where a 1,900-foot net caught 25,000 pounds of channel catfish (these were penned in a 250-foot by 50-foot enclosure to be removed

as needed); (2) in a 36-acre pond at Dumas where a 1,900-foot net caught 21,000 pounds of an estimated 50,000-75,000 pounds of channel catfish; and (3) in a 25-acre pond at the Bureau's Fish Farming Experimental Station at Stuttgart where a 1,900-foot net caught 2,300 pounds of an estimated 4,000 pounds of various species, including paddlefish weighing over 20 pounds.



Great Lakes Fishery Investigations

BIOLOGICAL RESEARCH AND SEA LAMPREY CONTROL, NOVEMBER 1965:

Some of the highlights of Great Lakes and Oahe Reservoir (South Dakota) biological research by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Ann Arbor, Mich., during November 1965:

Lake Superior: Biological research on Lake Superior during November was devoted to the assessment of whitefish on their spawning grounds and the distribution and abundance of young-of-the-year lake trout. Large-mesh gill nets set off the north side of Cat Island yielded 18 spawning whitefish with a single mature female. Trawling for young-of-the-year lake trout was conducted over in-shore spawning grounds, resulting in the capture of four young trout. A total of 80 young-of-the-year trout were taken on all grounds during the 1965 season.

The Bureau's research vessel Siscowet made its last biological research cruise of the 1965 season in Lake Superior during November and was berthed for the winter in Bayfield, Wis.

Sea Lamprey Control and Research: Field operations during November were limited to tagging adult sea lampreys, fishing of fyke nets in index streams, and routine maintenance of the Big Garlic River trapping device.

By the end of the month 1,300 parasitic-phase sea lampreys had been tagged by the U. S. Bureau of Commercial Fisheries and the Fisheries Research Board of Canada. Most of the tagging occurred in the St. Marys River below the ship locks and northern Lake Huron off DeTour and Cedarville. Tags were recovered and reported by commercial fishermen--82 tag recoveries have been reported: 3 from Whitefish Bay, Lake Superior, 3

from northern Lake Michigan, and the remainder from Lake Huron.

Fyke-net fishing in 10 Lake Superior streams was over by the end of the month. A total of 83 recently transformed sea lampreys were taken from 4 of the streams. Sea lampreys were captured in 4 of 5 streams sampled in northern Lake Michigan. Fyke-netting was continued in the Ocqueoc River, Lake Huron. The total take at the end of the month was 4,600 sea lampreys. These were held at the Bureau's Hammond Bay laboratory for marking experiments. As of the end of November 1965, 6 groups of 100 sea lampreys were marked with sulphide dyes, fluorescent dyes, and physical marks.

Note: See Commercial Fisheries Review, January 1966 p. 35.



Gulf Fishery Investigations

SHRIMP DISTRIBUTION STUDIES:

M/V "Gus III" Cruise GUS-35 (November 1-12, 1965): Small white shrimp of about 68 count were evident for the first time in fall 1965 from the up to 10-fathom depth in two statistical areas (area 13 and 14) covered during this cruise. As part of a continuing Gulf of Mexico shrimp distribution study, 8 statistical areas were covered by the research vessel Gus III, chartered by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex. The usual standard 3-hour tows made with a 45-foot flat trawl during the cruise totaled 25; 37 plankton tows, 38 bathythermograph (BT) casts, 147 water (Nansen bottle) casts, and 37 bottom grabs also were made.

Area 16 yielded a fairly good catch of 36 pounds of 21-25 count white shrimp from the up to 10-fathom depth, while areas 17, 18, and 19 yielded smaller quantities of white shrimp, mostly 51-67 count.

Catches of brown shrimp were spotty, with best trawl hauls at stations over 20 fathoms: Area 20 yielded 28 pounds of 26-30 count brown shrimp and area 17 yielded 13 pounds of 15-20 count. The amounts of brown shrimp taken in the different depth ranges of other areas covered were very small.

Notes: (1) Shrimp catches are heads-on weight; shrimp sizes are the number of heads-off shrimp per pound.

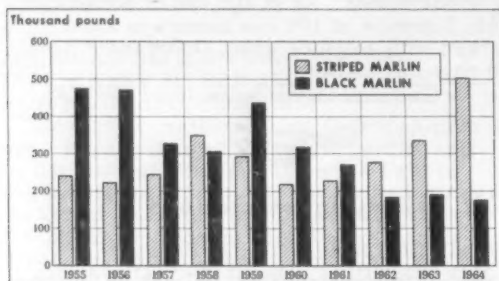
(2) See Commercial Fisheries Review, January 1966 p. 36.



Hawaii

FISHERY LANDINGS, 1964:

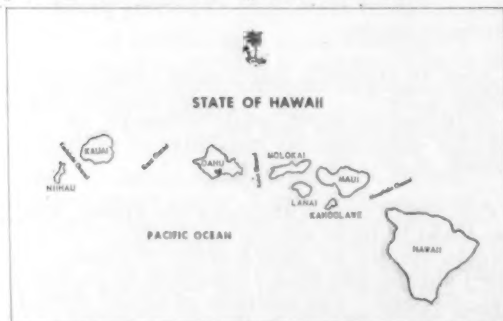
Commercial landings of fish and shellfish in the State of Hawaii in calendar year 1964 totaled 12.7 million pounds with an ex-vessel value of \$2.8 million. Compared with 1963 that was a gain of about 1.0 million pounds (8 percent) and \$168,500 (6 percent). Tuna (albacore, big-eyed, bluefin, little tuna, skipjack, and yellowfin) accounted for 82 percent of the quantity and 67 percent of the value of Hawaiian landings in 1964.



Hawaii catch of black and striped marlin, 1955-64.

Skipjack tuna is the major item in the Hawaiian fishery. The Hawaiian skipjack catch in 1964 totaled 9.0 million pounds valued at \$1.2 million as compared with 8.1 million pounds valued at \$1.1 million in 1963.

The high-priced big-eyed and bluefin tuna landings amounted to 839,485 pounds with an ex-vessel value of \$493,568 in 1964--down somewhat from the 1963 landings of 948,253 pounds valued at \$501,726.



The 1964 Hawaiian landings also included 500,117 pounds of yellowfin tuna, 501,814 pounds of striped marlin, 174,173 pounds of black marlin, 292,262 pounds of jack mackerel, 291,363 pounds of snapper, 160,526

pounds of big-eyed scad, and 107,912 pounds of jack crevalle.

Oahu led the Hawaiian Islands in landings during 1964 with 10.2 million pounds or 80 percent of the total. The island of Hawaii was next with 1.6 million pounds, followed by Maui with 712,000 pounds. The remainder of the catch was landed at ports in the Islands of Molokai, Kauai, and Lanai.

The 1964 Hawaiian catch was taken by 743 fishermen. Fishing craft operated during the year included 57 vessels (craft of 5 net tons and over), 350 motor boats, and 24 other boats.

Note: See *Commercial Fisheries Review*, Jan. 1965 p. 33.



Industrial Fishery Products

U. S. FISH MEAL AND SOLUBLES:

Production and Imports, January-October 1965: Based on domestic production and imports, the United States available supply of fish meal for the first 10 months in 1965 amounted to 463,585 short tons--118,776 tons (or 20.4 percent) less than during the same period in 1964. Domestic production was

U. S. Supply of Fish Meal and Solubles, January-October 1965			
Item	Jan.-Oct.		Total 1964
	1965	1964	
. . . (Short Tons) . . .			
Fish Meal and Scrap:			
Domestic production:			
Menhaden	157,603	148,148	160,349
Tuna and mackerel	22,657	17,213	21,113
Herring	11,801	8,376	8,881
Other	17,527	33,019	44,909
Total production	209,588	206,756	235,252
Imports:			
Canada	36,866	46,784	54,769
Peru	204,841	300,820	348,025
Chile	5,201	11,302	12,942
Norway	49	-	-
So. Africa Rep.	2,900	13,487	18,581
Other countries	4,140	3,212	4,826
Total imports	253,997	375,605	439,143
Available fish meal supply	463,585	582,361	674,395
Fish Solubles:			
Domestic production			
	86,691	86,791	93,296
Imports:			
Canada	1,293	1,315	1,553
So. Africa Rep.	-	935	987
Other countries	2,536	1,802	1,965
Total imports	3,829	4,052	4,505
Available fish solubles supply	90,520	90,843	97,801

2,832 tons (or 1.4 percent) higher, but imports were 121,608 tons (or 32.4 percent) lower than in January-October 1964. Peru continued to lead other countries with shipments of 204,841 tons.

The United States supply of fish solubles during January-October 1965 amounted to 90,520 tons--a decrease of 0.4 percent as compared with the same period in 1964. Domestic production dropped 0.1 percent and imports of fish solubles decreased 5.5 percent.

U.S. FISH MEAL, OIL, AND SOLUBLES:

Production, October 1965: During October 1965, a total of 12,698 tons of fish meal and about 9.1 million pounds of marine-animal oil was produced in the United States. Compared with October 1964, this was an increase of 4,120 tons of fish meal and about 3.5 million pounds of marine-animal oil. Fish solubles production amounted to 6,609 tons--an increase of 1,473 tons as compared with October 1964.

U. S. Production of Fish Meal, Oil, and Solubles, October 1965 1/ with Comparisons					
Product	Oct.		Jan.-Oct.		Total 1964
	1965	1964	1965	1964	
(Short Tons)					
Fish Meal and Scrap:					
Herring	683	632	11,801	8,376	8,881
Menhaden 2/	6,913	4,693	157,603	148,148	160,349
Tuna and mackerel .	2,983	1,720	22,657	17,213	21,113
Unclassified	2,119	1,533	17,527	33,019	34,809
Total	3/12,698	3/8,578	3/209,588	3/206,756	3/225,152
(1,000 Pounds)					
Fish solubles:					
Menhaden	4,152	2,603	68,687	64,673	68,738
Other	2,457	2,533	18,004	22,118	24,558
Total	6,609	5,136	86,691	86,791	93,296
(1,000 Pounds)					
Oil body:					
Herring	339	360	7,348	9,896	10,354
Menhaden 2/	7,445	4,187	162,997	145,098	157,730
Tuna and mackerel .	822	729	4,328	4,151	4,816
Other (inc. whale) .	483	331	4,663	7,008	7,298
Total oil	9,089	5,607	179,336	166,153	180,198

1/ Preliminary data.
2/ Does not include a small quantity of fish and marine-animal meal and scrap because production data are not available monthly.

1/ Preliminary data.
2/ Includes a small quantity of thread herring.
3/ Does not include a small quantity of shellfish and marine-animal meal and scrap because production data are not available monthly.

Production by Areas, November 1965:
Preliminary data as collected by the U.S. Bureau of Commercial Fisheries:

U.S. Production 1/ of Fish Meal, Oil, and Solubles, November 1965 (Preliminary) with Comparisons			
Area	Meal Short Tons	Oil 1,000 Pounds	Solubles Short Tons
November 1965:			
East & Gulf Coasts	8,490	7,104	3,627
West Coast 2/	1,839	358	1,262
Total	10,329	7,462	4,889
Jan.-Nov. 1965:			
Total	219,917	186,798	91,580
Jan.-Nov. 1964:			
Total	217,488	174,456	90,557

1/ Does not include crab meal, shrimp meal, and liver oils.
2/ Includes American Samoa and Puerto Rico.

U. S. MARINE OIL SUPPLY SITUATION AND FOREIGN TRADE, OCTOBER 1964-SEPTEMBER 1965 WITH COMPARISONS:

U. S. stocks of marine oils on September 30, 1965, were reported as 191.9 million pounds, an increase of 30 percent from those on hand a year earlier. During October 1964-September 1965, U. S. production of marine oils was about the same as in the preceding 12 months, but exports were down sharply while imports increased. (*Fats and Oils Situation*, November 1965, U. S. Department of Agriculture.)

U.S. Marine Oil Production, Imports, Exports, and Stocks, October-September 1963/64 and 1964/65		
	Oct.-Sept.	
	1964/65	1963/64
	. (Million Pounds) .	
Production	189.9	192.0
Imports for Consumption:		
Marine-mammal oils	80.5	56.9
Fish-liver oils, medicinal	13.4	15.7
Other fish and fish-liver oils	0.9	4.4
Total	94.8	77.0
Exports: 1/		
Fish oils	116.7	196.4
Marine-mammal oils	0.7	7.3
Total	117.4	203.7
Marine oil stocks: 2/		
Sept. 30, 1965	191.9	-
Aug. 31, 1965	204.4	-
Sept. 30, 1964	147.4	-

1/ Includes re-exports.
2/ Consists of factory and warehouse stocks including Government stockpile.

Note: Table does not indicate U.S. domestic consumption. For calendar year 1964, U.S. domestic consumption of marine oils was reported as 33.6 million pounds of sperm oil and 47.3 million pounds of fish and marine oils other than sperm oil.

SWINE GROW FASTER WHEN FISH MEAL IS ADDED TO DIET:

Swine-feeding trials to determine the protein supplemental value of fish meal when added to various cereal-vegetable protein mixtures have been conducted by the U. S. Bureau of Commercial Fisheries Technological Laboratory at College Park, Md. Results indicated

that pigs fed on corn-cottonseed meal supplemented with fish meal were marketed 34 days sooner, were 27 pounds heavier, and required less feed for each pound of gain than those animals fed on a corn-cottonseed meal diet alone.



In 92 days after the start of the experiment, pigs fed the corn-cottonseed meal diet containing 6-percent fish meal had reached 200 pounds (the prescribed marketing weight), while those receiving 3-percent fish meal in their diets weighed 184 pounds, and those receiving no fish meal only 173 pounds--a difference of 27 pounds.



Inland Fisheries Explorations and Gear Development

OAHE RESERVOIR TRAWLING STUDIES:

Reservoir Research Vessel "Hiodon"
Cruise 5 (October and November 3-5, 1965): This was another experimental trawling cruise in selected zones of Oahe Reservoir, South Dakota, located on the Upper Missouri River. Trawling operations by the reservoir fishery research vessel Hiodon of the U. S. Bureau of Commercial Fisheries were conducted in Zones 1, 2, 3, 4, and 6 of the reservoir during October 1965. Following the October explorations, the Hiodon concluded its Oahe Reservoir trawling experiments for 1965 with a 3-day survey November 3-5.

FISHING OPERATIONS: A total of 7 drags was made with a 35-foot (headrope) trawl and 52 drags were made with a 52-foot trawl. Mesh size (extended measure) of the cod end of the 35-foot trawl was $\frac{1}{2}$ inch and of the 52-foot trawl, $1\frac{3}{4}$ inches. Drags made over inundated flats totaled 57 and another 2 drags were made in the old river channel. Trawling depths ranged from 8 to 70 feet but most of the drags (46) were made at depths of 10 to 30 feet. Eight of the 52 drags made with the 52-foot trawl were made at night.

Normally, drags lasted 15 minutes each but 2 were 30-minute drags made in Zone 6. The catches of the 30-minute drags were similar in quantity and composition to the 15-minute drags.

Fouling of the gear was not a serious problem during the cruise. One drag was terminated early because of snags, and 2 drags were incomplete because the otter boards dug into the soft bottom. The largest catch per individual drag was made at night in Zone 6 when 1,625 pounds were caught; the smallest catch was in Zone 2 producing only one pound of fish.

FISHING RESULTS: The 59 drags made on the cruise caught a total of 11,365 fish (age group II or older) weighing 12,394 pounds for an average of 193 fish or 210 pounds per drag. Carp (average weight 2.0 pounds) accounted for 38.0 percent of the catch by number and 68.6 percent by weight. Yellow perch accounted for 42.0 percent of the catch by number but only 3.6 percent of the total weight and averaged 0.09 pounds in weight. Bigmouth buffalofish (average weight 2.8 pounds) made up 5.6 percent of the catch by number and 14.6 percent of the total weight.

Seven drags made during the November 3-5 explorations yielded a total of 1,770 fish (age group II or older) weighing 1,985 pounds for an average catch of 253 fish or 284 pounds per drag. The catch was made up (by weight) of 75.8 percent carp, 6.1 percent drum, 5.2 percent bigmouth buffalofish, and 4.3 percent carpsucker. Other species individually accounted for less than 2 percent of the total weight. Carp averaged only 1.5 pounds; bigmouth buffalofish, 2.9 pounds; drum, 0.5 pounds; and carpsucker, 1.5 pounds.

The most productive drag during the early November operations was made with the 35-foot trawl which caught 520 fish weighing 710 pounds (83 percent was carp). The least productive drag was made with the same trawl in the same area--140 fish weighing 50 pounds (27 percent carp and 23 percent yellow perch).

Of 3,900 young-of-the-year fish caught in the 7 drags, 57 percent were black bullheads and 31 percent yellow perch. Other species included black crappie, white bass, goldeye, drum, white crappie, northern pike, sauger, carpsucker, carp, and channel catfish. Of 72 yearling fish taken, 33 percent were goldeye, 24 percent sauger, and 21 percent carpsucker. Other yearling fish caught included black bullhead, yellow pike (walleye), bigmouth buffalofish, and northern pike.

Note: See Commercial Fisheries Review, January 1966 p. 38.

Maine Sardines

CANNED STOCKS, NOVEMBER 1, 1965:

Canners' stocks of Maine sardines on November 1, 1965, were up 60,000 cases from those of the same date in 1964, but down 566,000 cases from stocks on hand November 1, 1963.

The new Maine sardine canning season opened on the traditional date of April 15, 1965, and the pack to November 13, 1965, totaled 1,266,000 standard cases, as compared with the pack of 848,000 cases during the same period of 1964. Bad weather limited herring fishing in late November and herring landings were very light.

ings in 1965 were moderately above a year earlier, but still considerably below the more than 2-billion-pound annual catches of the early 1960's. During the entire 1965 season, landings in only two months equalled the average catch for the 1960-64 period. Atlantic Coast landings were on a par with 1964 while the Gulf of Mexico catch was up more than one-tenth.

The quantity of fish meal available for domestic distribution during 1965 was down substantially due to a decline of more than one-third in United States imports--domestic fish meal production from menhaden and other finfish (excluding meal from shellfish and marine animals) was near that of 1964. Pre-

Canned Maine Sardines--Wholesale Distributors¹ and Canners² Stocks, November 1, 1965, with Comparisons^{1/}

Type	Unit	1965/66 Season			1964/65 Season			1963/64 Season			
		11/1/65	7/1/65	6/1/65	4/1/65	1/1/65	11/1/64	7/1/64	6/1/64	4/1/64	1/1/64
Distributors	1,000 actual cs.	289	194	198	236	238	291	234	254	291	261
Canners	1,000 std. cs. 2/	689	295	203	314	538	629	514	499	658	1,063

^{1/}Table shows marketing season from November 1-October 31.

^{2/}100 3 $\frac{3}{4}$ -oz. cans equal 1 standard case.

Source: U.S. Bureau of the Census, Canned Food Report, November 1, 1965.

The new law legalizing year-round canning of Maine sardines removed the traditional December 1 closing date for the packing season. The new legislation opened winter canning to all Maine sardine packers and allows winter canning with domestic as well as imported herring. About 10 Maine sardine canneries were still operating in late November 1965.

Final data show the 1964 pack as 865,751 standard cases (100 cans of 3 $\frac{3}{4}$ -oz.) canned in 23 plants in Maine. That was much less than the 1,619,000 cases packed during 1963, but more than the 754,000 cases packed during the regular season in 1961 when fishing was extremely poor.

The total supply available on November 1, 1965, was 1,518,000 standard cases, 5 percent more than the supply of 1,440,000 cases a year earlier.

Note: See Commercial Fisheries Review, October 1965 p. 36.



Menhaden

REVIEW OF U. S. MENHADEN INDUSTRY, 1965:

The menhaden fishery, the largest U. S. fishery in terms of landings, has again fallen short of expected production. Menhaden land-

liminary estimates point to production of more menhaden meal in 1965 but less meal from other finfish.



Brailing menhaden from the pocket or bunt of a purse seine. Fish meal, oil, and solubles are produced from menhaden. More modern purse seiners are now equipped with large suction hoses to transfer the fish from the net to the vessel.

World production of fish meal in 1965 probably was somewhat below a year earlier, due largely to the sizable decrease in Peruvian output. Over the past 5-6 years, Peru has become the world's largest producer-exporter.

U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 755

er of fish meal. In 1965, however, the anchoveta resource was not as abundant as in 1964, resulting in a sizable decrease in Peru's anchovy meal production. Therefore, United States fish meal imports from Peru in 1965 were down considerably from the record of 1964.

The price of fish meal in the United States is affected to some extent by the domestic demand for fish meal as a feed ingredient by both the broiler and livestock industries. However, world supply and demand affects the domestic price level to a much larger degree. In 1965, world production of fish meal was down from a year earlier, and demand, both domestic and foreign was strong. Those factors caused U. S. prices of both domestic and foreign meal to advance to a record high of \$186 per ton in November 1965. At this price level, there are indications that the ratio of fish meal to other feed ingredients used in broiler and animal rations may be further reduced.

The U. S. broiler industry is the largest single user of fish meal. Further expansion in the broiler industry is expected because of: (a) an expanding number of people, (b) an increase in per capita disposable income, and (c) broiler meat prices as related to prices of other meat products. As more broilers are produced, the quantity of fish meal consumed will increase when fish meal prices are competitive with other high-protein feed-stuffs. Based on research in least-cost broiler ration formulation and June 1965 wholesale prices of feed ingredients, fish meal prices were competitive when below \$157 per ton. If high fish meal prices continue, the broiler industry may experiment with rations which include other feed ingredients and find that the results are comparable to rations with fish meal included. (Branch of Current Economic Analysis, Division of Economics, U. S. Bureau of Commercial Fisheries.)



Michigan

NEW STATION FOR WARM-WATER FISH RESEARCH PLANNED:

As the first step toward establishing a warm-water fish research station in southeastern Michigan, a privately-owned fish-rearing facility south of Saline, Mich., was

leased late in 1965 by the State of Michigan Conservation Department. The property will be bought outright after July 1, 1966, if the money needed for the purchase is appropriated. The new facility will be used as a unit of the Conservation Department's Institute for Fisheries Research at Ann Arbor, Mich.

First efforts of preparing the leased property for fisheries studies will be aimed largely at making improvements on 17 fish-rearing ponds. Some attention will also be given to several buildings covered by the lease. Longer-range plans call for developing about 14 additional ponds, and building an experimental aquarium or "wet" laboratory.

After the site is readied for operation as a full-fledged research station, it is hoped to carry out three major fish studies in the ponds. One of the studies will be on the production of fish-food organisms. Basically, that research will be to try to determine which types of organisms can best be increased to provide better food supplies for fish. Under a second branch of investigations, some of the station's ponds will be used to study bluegills which will have been subjected to radiation. The main thing it is hoped to find out is whether radiation can be used effectively to sterilize bluegills. The emphasis on that research will be efforts to come up with a technique which will control overpopulations of stunted bluegills.

The third main research project scheduled for the new station will involve studies on the natural reproduction of bass and the survival of bass eggs and fingerlings. Factors such as water temperatures, food supplies, water chemistry, and predation will be weighed in an effort to learn their effects on that species.

Several other research projects are being planned for the scheduled experimental aquarium. Among them will be a study measuring pituitary extract in the blood systems of bluegills to see if fish growth can be speeded up. Tests will also be conducted in the aquarium in an attempt to find a suitable chemical dye which can be used for the large-scale marking of fish to assist fact-finding and management work. (News Bulletin, Michigan Department of Conservation, Lansing, November 18, 1965.)



Nautical Charts

LISTS FOR ATLANTIC AND GULF COASTAL WATERS:

The free distribution to mariners of catalogs listing all available nautical charts for use in navigating U. S. Atlantic and Gulf coastal waters was scheduled to begin January 2, 1966, by the Coast and Geodetic Survey, U. S. Department of Commerce. Similar catalogs will be issued in mid-summer for the Pacific and Alaskan coasts. The catalogs will be accordion-folded, similar in format to road maps.

The catalog for the Atlantic and Gulf coasts also includes Puerto Rico and the Virgin Islands; for the Pacific coast it includes Hawaii, Guam, and the Samoan Islands; and for the Alaskan coast it includes the Aleutian Islands.

The catalogs list the numbers of all charts, the areas they cover, chart prices, and the scale of each chart. Both small craft and conventional charts are listed. Small-craft chart numbers and the outline of the area covered are shown in green and the conventional nautical charts in magenta and blue. The catalogs also include a list of tide tables, coast pilots (sailing direction), current tables, and tidal current charts.

Nautical chart diagrams have been available before, but on a much more limited scale. Information up to now has generally been furnished only for specific areas rather than for entire coasts.

An initial printing of 60,000 to 70,000 copies has been run off for distribution at exhibits of Commerce's Environmental Science Services Administration at boat shows along the Atlantic and Gulf coasts. The catalogs are also available, in person or by mail, from chart distribution centers at Coast and Geodetic Survey offices in San Francisco and New York and at the Survey's sales office, 1125 Commerce Building, Washington, D. C. 20230. A list of the 600 agents who sell nautical charts is also available in a similar format.



New York

NEW SITE TO BE ACQUIRED FOR NEW YORK CITY WHOLESALE FISH MARKET:

New York City plans to acquire a 100-acre site in the Hunts Point section of the Bronx

for the establishment of a wholesale fish and meat market. The Mayor of New York has certified \$2.3 million in additional funds for the purchase and directed the various City agencies to proceed with the acquisition. It was hoped that the sale could be consummated early in 1966.

The new fish and meat markets will house the fish dealers located in the existing Fulton Fish Market and the wholesale butchers in the present 14th Street, Brook Avenue, and Harlem Meat Markets. The Hunts Point site will offer modern quarters with truck-loading platforms and direct rail connections. The Hunts Point site is contiguous to the 126-acre New York City Product Terminal. When completed, the new meat and fish market together with the produce terminal will form the largest perishable food distribution center in the world. (New York City Wholesale Markets Progress Report, November 1965.)

Note: See Commercial Fisheries Review, July 1965 p. 30.



North Atlantic

SOVIET FISHING ACTIVITY OFF COAST, DECEMBER 1965:

Soviet vessel fishing activity in December 1965 increased slightly over the previous month and was about normal for that time of year. A total of 35 Soviet vessels was sighted during the month. They were identified as 28 fish-factory stern trawlers, 2 "Skyplev Class" processing and refrigerated stern trawlers, 4 refrigerated fish transports, and 1 medium class side trawler. This compared with an estimated 25 vessels in November 1965 and 20 vessels in December 1964.



Fig. 1 - Soviet stern trawler-factoryship of Pushkin class fishing in North Atlantic.

The Soviet vessel observations were made by the staff of the Fisheries Resource Man-

agement Office, U. S. Bureau of Commercial Fisheries, Gloucester, Mass., which conducts weekly reconnaissance flights cooperatively with the U. S. Coast Guard.



Fig. 2 - Another Soviet factory-type stern trawler in North Atlantic.

Except for a short period late in the month, Soviet fishing operations were generally confined to the "southeast part" of Georges Bank, 120 to 130 miles southeast of Cape Cod, fishing at depths of 30 to 50 fathoms. The majority of vessels were actively fishing. Heavy to moderate catches of fish on deck and in their trawls appeared to be primarily whiting, scrod haddock and related mixed groundfish. U. S. fishing vessels reported excellent catches of scrod haddock throughout the month, while fishing in the immediate vicinity of the Soviet fleet.



Fig. 3 - Soviet refrigerated fish transport operating in the North Atlantic.

Late in December the Soviets abruptly shifted their fishing operations southward along the 100-fathom curve from Block Canyon (60 miles south of Block Island, R.I.) to Veatch Canyon (30 miles south of Nantucket lightship). Apparently due to insufficient quantities of fish in those areas, the Soviets resumed their operations on Georges Bank. It was expected, however, that they would return to fish for red hake as they did so successfully from January through March 1965.

The British factory stern trawler Fairtry I was seen on Georges Bank during the month.

The sisterships Fairtry II and Fairtry III were sighted on the "northeast peak" of Georges Bank in February 1964.

A very limited number of Soviet fishing vessels have been operating off the Eastern Nova Scotia areas.

Note: See Commercial Fisheries Review, January 1966 p. 40.



North Pacific Fisheries Explorations and Gear Development

HAKE AND ANCHOVY POPULATION SURVEY:

M/V "John N. Cobb" Cruise 74 (October 11-November 18, 1965): To determine the geographic and bathymetric distribution of schools of Pacific hake (Merluccius productus) and anchovy (Engraulis mordax) along the coasts of Vancouver Island, British Columbia, Washington, and Oregon as far as Coos Bay during October and November was the primary objective of this cruise. Secondary objectives by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb were to: (1) obtain biological data on those species, (2) obtain additional data relative to the catching efficiency of the Mark II "Cobb" pelagic trawl, and (3) obtain bathythermograph (BT) data.

The gear used was the same as for previous hake explorations in that the echosounder was used to locate the fish schools and the "Cobb" pelagic trawl was used to fish favorable looking echograms.

Onshore-offshore echo-sounding transects were made at oblique angles to the coasts between the 20- and 200-fathom contours; between Willapa Bay and Destruction Island, parallel transects were run from the 20- to 60-fathom contour.

During the first three weeks of the cruise the area from Cape Flattery, Wash., to Cape Cook on the west coast of Vancouver Island was surveyed. Echo-sounding indicated hake at a depth of 65 fathoms over a bottom depth of 80 fathoms of water off Barkley Sound, Vancouver Island. A one-half-hour tow (lat. 48° 41' N., long. 125° 44' W.) yielded a catch of 18,000 pounds of hake. The fish ranged from 51 to 68 centimeters (20.1 to 26.8 inches) and averaged 57 centimeters (22.4 inches)

long. Sounding transects showed the school to be about 4 miles wide and 6 miles long, and that it was confined to a small area of Barkley Sound (80-fathom depth) which extended into La Perouse Bank. The surrounding area of 50-fathom depths or less showed no signs of hake. A 1-hour tow was made on light echo-tracings at lat. $48^{\circ}45'N$, long. $126^{\circ}12'W$, which yielded 200 pounds of hake. They also averaged 22.4 inches with a range of 19.6 to 27.2 inches. That area was about 20 miles west of the Barkley Sound school of hake over a bottom depth of about 80 fathoms. The fish were about 65 fathoms from the surface. No hake were located from that point to Cape Cook.

During the last 3 weeks of the cruise, sounding transects were made from Cape Flattery, Wash., to Coos Bay, Oreg. No appreciable signs (echo-tracings) of either hake or anchovies were found during that period. A 30-minute tow on a light echo-trace at lat. $47^{\circ}35'N$, long. $124^{\circ}50'W$, yielded 90 pounds of dogfish (*Squalus acanthias*), 80 pounds of rockfish (*Sebastes* sp.), and 3 female hake in a near-ripe stage.

Related activities of the cruise included: (1) the collection of biological data by personnel of the Bureau's Seattle Biological Laboratory, (2) the delivery of hake samples to the Seattle Technological Laboratory for meat analysis, and (3) making the usual bathythermograph (BT) observations.

Note: See *Commercial Fisheries Review*, December 1965 p. 41.

PELAGIC FISHING GEAR RESEARCH:

M/V "St. Michael" Cruise 7 (August-November 1965): A 100-day gear research cruise for fishing hake and herring was completed November 16, 1965, by the exploratory fishing vessel St. Michael, chartered by the U. S. Bureau of Commercial Fisheries. Fishing for hake was conducted along the coast of Washington from Cape Flattery to the Columbia River. Other cruise activities included diving operations in Puget Sound near Seattle, and herring fishing in inside waters of Beltingham Bay and in the Strait of Georgia.

Scheduled objectives of the cruise were:

1. Test the effectiveness of a $\frac{2}{3}$ -scale pelagic trawl, a 440-mesh "Cobb" pelagic trawl, a 640-MONO-pelagic trawl, and a lampara trawl No. 2 on Pacific hake (*Merluccius productus*).
2. Using the above nets from the vessel St. Michael, conduct parallel comparative tows with another Bureau chartered vessel, the Western Flyer, using a standard 18 "Cobb" pelagic trawl.

3. Evaluate various electronic telemetry devices, including a variable resistor catch-load indicator, wing-tip depth sensing units, headrope transducer, simplified bottom contact indicator, Furuno Net Sonde, and Standard Control, Inc.'s Depth Telemetry System.

4. Assist the Western Flyer to locate hake schools off the coasts of Washington and Oregon.

5. With the aid of SCUBA-equipped scientists, visually evaluate the physical characteristics of various pelagic trawls in operation. Determine effect of non-symmetrical bridles on net opening.

6. Make underwater observations of fish within the influence of a trawl and photograph their reactions.

7. Conduct fishing trials for herring (*Clupea harengus pallasii*) using a Canadian-type small-mesh midwater trawl.

EQUIPMENT: The St. Michael is a 72-foot seine-type vessel powered by a 380-hp. engine and was operated by a four-man crew. Hydrofoil otterboards and electrical towing cable were used on all drags.

Tests were conducted using the following nets which were constructed of multifilament web except the 640-MONO-pelagic trawl:

1. 640-MONO-pelagic trawl (similar to a standard "Cobb" trawl except that it has 640 meshes across the mouth instead of 600 meshes, the anterior 400 meshes of the body are made of ribbon type monofilament web, and the posterior 200 body meshes and wings are of multifilament web).

2. A $\frac{2}{3}$ -scale pelagic trawl (same proportions as a standard "Cobb" pelagic trawl except using 2" instead of 3" web).

3. A 440 pelagic trawl (a shortened version of the standard, having 440 meshes across the mouth instead of 600 meshes).

4. Lampara trawl No. 2 (a trawl with very long wings similar to a lampara seine). It differs from the original net in that the rope and chain headrope and footrope are replaced by wire rope and the percentage web hang-in is less.

5. Canadian-type herring trawl (a small pelagic trawl having a 73-foot headrope and variable mesh size from 5" at headrope to $1\frac{1}{4}$ " mesh at cod end).

RESULTS: Comparative drags: A limited number of parallel drags was made by the St. Michael near the Western Flyer which towed a standard 18 pelagic trawl. Both the $\frac{2}{3}$ -scale and 440-trawls caught hake at about the same rate as the standard size net. Maximum catch for the $\frac{2}{3}$ -scale trawl was 18,000 pounds in 60 minutes and 45,000 pounds in 90 minutes for the 440 trawl.

The 440 trawl moved through the water about 15 percent faster than the standard net, using the same vessel horsepower, thus making it easier to control in strong cross tides. No similar data is available for the $\frac{2}{3}$ -scale trawl.

No comparative tows were made using the lampara trawl No. 2. Four independent tows

on good echo-sounding traces yielded an average of 7,200 pounds of hake per tow, considerably less than expected. The largest single tow was 12,000 pounds.

ELECTRONIC DEVICES: A quick disconnect electrical jumper system was successfully tested. It was used to by-pass the otterboards so energy could be transmitted from the vessel to various telemetry devices located on the trawl. Conventional $\frac{1}{2}$ " cable bridles were replaced with electrical conductor cable.

Prior to the development of the jumper system, depth-sensing units were terminated at the otterboards. The depth of the otterboards in relation to the trawl was not exactly known. During the diving operation, the divers found that the otter boards were only 5 to 10 feet deeper than the top wing tips. Using the jumper system allowed the sensing units to be placed at each upper wing tip, each lower wing tip, or at one upper and lower wing tip. In this way, the exact depth of the headrope and footrope was known and centered in the greatest fish concentration.

Some success was achieved in using a head-rope transducer connected to the wing tip bridle termination which read out on the pilothouse depth-sounder. When functioning properly, fish passing into the net, depth of the footrope, and depth from footrope to the ocean floor was shown on a chart. Additional testing of this device is necessary.

A catch-load indicator composed of a variable resistor attached to the cod end was tested. The signal was transmitted through a wire threaded along a corner ribline to the bridle and towing cable and up to the pilothouse where it read out on a calibrated ammeter. Only limited success was achieved with this instrument due to water leakage in the electrical components. When perfected, this device will be of major value in the trawl fishery.

The bottom contact indicator, composed of a mercury switch attached to a heavy weight, also utilized the electrical towing cable to transmit an electrical signal from the switch to a light in the pilothouse. The object was to suspend the weight a predetermined distance below the otter board on an electrical cable. When the weight struck bottom, the new angular position would cause the switch to actuate. The pilothouse light then came on,

indicating that the otter board was a distance above bottom equal to the cable length. In practice, the weight necessary to hold the switch nearly vertical while under tow was too great to be conveniently handled.

A Furuno "net sonde" was tested as a net depth indicator; it worked well for three tows before it malfunctioned.

The Standard Control, Inc.'s Depth Telemetry System was equipped with an inadequate meter readout. A new meter was obtained but was not tested.

UNDERWATER OBSERVATIONS: Net Configuration: All variations of the "Cobb" pelagic trawl had effective configurations. Diver observations were made in less than 120 feet, using 40 fathoms towing cable. Not enough towing cable can be put out to permit full net expansion during diver observations. The $\frac{2}{3}$ -scale pelagic trawl opens to about 40 by 23 feet across the mouth. The 440-pelagic trawl opens to about 70 by 30 feet, and the 640-pelagic trawl opens to about 75 by 34 feet. The lampara trawl No. 2 had an improved configuration over the original design tested in 1964. Wings and mouth opened to a maximum of 20 feet vertically. A Canadian-type midwater herring trawl constructed of variable mesh web was evaluated by divers. This net has an excellent configuration in the water. Because of its smaller size, it can be towed much faster for a given power than any of the pelagic trawls. A large amount of water is strained, indicated by the fact that the divers took a current reading of 2.8 knots within the trawl.

Net Bridles: Instead of the usual 60-fathom bridles, 40-fathom bridles from the otterboard to the trawl wing tips were used. Underwater measurement showed there was no loss in net opening. Both 60-fathom and 40-fathom bridle sets were tested using electrical conductor cable. There was no measurable effect on the trawls when one electrical bridle was paired with a $\frac{1}{2}$ " conventional cable.

Fish Behavior: Divers observed bottom-fish, herring, smelt, and squid within the influence of the trawls. Fish could easily swim along within the "Cobb" pelagic trawls. However, herring (5 to 7 inches long) had difficulty maintaining their position within the Canadian-type trawl when water flow was over 2.5 knots. The divers observed squid (10 to 12 inches long) which swam with her-

ring against a 2-knot water current in the trawl for several minutes. The large-mesh web permitted them to escape when they became tired and drifted into it.

Hake, which had been caught during a 30-minute tow in 25 fathoms of water, were hauled in to a 10-fathom depth and then the tow was resumed for another 90 minutes. Divers descended to observe the effect of a 15,000-pound catch on the configuration of the trawl. No hake were found swimming in the trawl body. Few fish were in the anterior portion of the cod end. A large bag of fish (about 10 feet in diameter) formed at the bitter end of the cod end. This caused the forward part of the cod end to be stretched nearly closed and possibly the trawl mouth area to be reduced, suggesting that the net catch rate probably goes down as the catch increases. Most hake were able to swim away when the cod end was opened at 10 fathoms by the divers.

Midwater herring trawling experiments: The variable web Canadian-type midwater trawl was fished in northern Puget Sound. Echo traces indicated large schools of herring and smelt were present and some catches were made by local purse-seine vessels. Seven drags were made on excellent traces. The largest single catch was about 800 pounds of mixed herring and smelt.

GENERAL OBSERVATIONS: Although fish signs observed on the echo-sounder were good, and the underwater configuration of the lampara trawl and Canadian-type midwater trawl was excellent, fish catches by both nets were less than expected. Herring, smelt, and squid appear to swim out of a net; conversely, hake have little swimming endurance and are readily carried back to the cod end.

Note: See Commercial Fisheries Review, October 1965 p. 44.



Oceanography

MARINE ENGINEERING EXPERIMENT STATION PROPOSED BY SOUTHERN NEW ENGLAND GROUP:

A 6 member committee was formed in late 1965 by the Southern New England Marine Sciences Association (SNEMSA) to study the possibilities of establishing a marine engineering experiment station.

"As now envisioned, the experiment station would be a nonprofit research organization which would seek to bridge the gap between university scientists and industry with the ultimate objective of reaping greater benefits from our ocean resources," said the dean of the University of Rhode Island Graduate School of Oceanography, who is also Chairman of SNEMSA.

The Southern New England Marine Sciences Association was formed in the spring of 1965 by the University of Rhode Island and marine-oriented businesses and industries to promote the Southern New England region as a national center for study and development of ocean sciences. The 71 members of the Association are concentrated in the 75-mile strip of land from New London, Conn., to Woods Hole, Mass. (University of Rhode Island, December 7, 1965.)

Note: See Commercial Fisheries Review, July 1965 p. 38.

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NEW INSTITUTE FOR OCEANOGRAPHY SET UP WITHIN U. S. DEPARTMENT OF COMMERCE:

The formation of an Institute for Oceanography was announced December 26, 1965, by the Environmental Science Services Administration (ESSA) of the U. S. Department of Commerce.

ESSA was established in July 1965 within the Department of Commerce to serve as a focus for national efforts to describe, understand, and predict man's natural environment. It includes the Weather Bureau, the Coast and Geodetic Survey, and the former Central Radio Propagation Laboratory of the National Bureau of Standards.

The Institute for Oceanography, one of ESSA's four Institutes for Environmental Research, will conduct a comprehensive research program designed to gain new knowledge of the ocean and its boundaries with the atmosphere, the shore, and the sea floor. Its wide range of marine research activities includes marine geology and geophysics, physical oceanography, and the interactions between the ocean, the earth, and the atmosphere.

"Greater understanding of the ocean is needed to improve and expand the services ESSA provides," the administrator of the agency said in announcing the creation of the new Institute. "Lack of knowledge about the

interactions between the atmosphere and the ocean is a major obstacle to long-range weather forecasting and to improving predictions of ocean waves, water temperatures, coastal currents, and surf and other ocean conditions."

"Safe and economical use of the ocean," he states, "requires that we know much about the whole complex and fascinating marine environment. By expanding man's knowledge in the fields of physical oceanography and marine geology, the Institute for Oceanography will assist those groups interested in exploiting ocean resources."

The new Institute for Oceanography has headquarters in Washington, D. C., and field installations at Norfolk, Va., Seattle, Wash., and Honolulu, Hawaii. In addition to those oceanographic research projects conducted wholly within the Institute, it will encourage and support cooperative research programs carried out jointly with universities and private institutions.

Working with the Coast and Geodetic Survey, the Institute for Oceanography will continue the scientific exploration and mapping program (SEAMAP) which is part of the Interagency Committee on Oceanography's U. S. National Plan for Ocean Surveys. Those systematic oceanographic surveys will be conducted aboard vessels operated by the ESSA Coast and Geodetic Survey. In the past, the SEAMAP program has been limited to the area between the Aleutian and Hawaiian Islands. It will be expanded in 1966 when two new oceanographic vessels are commissioned by ESSA. Those two ships--the Oceanographer and the Discoverer--will be the largest, most modern oceanographic research vessels built in the United States. Each vessel will have more than 4,100 square feet of laboratory area.

Data gathered aboard vessels of the Coast and Geodetic Survey are used by the Institute's scientists in studies of marine geology and geophysics. The marine geologists investigate the topography of our Continental Shelves to learn how they were formed and how they have changed with time. Characteristics and distribution of bottom sediments and the environmental processes that caused them also are studied by the marine geologists. The Institute's geophysical research includes marine gravity and magnetic studies at sea and investigations of seabed structures below the sea floor.

In the field of physical oceanography, Institute scientists investigate ocean circulation, tides, and waves, as well as the physical and chemical properties of sea water. An important task facing the Institute is the development of new methods of predicting the height of tsunamis or seismic sea waves, in order to improve the accuracy of forecasts issued by the Coast and Geodetic Survey's Seismic Sea Wave Warning System.

The Institute's physical oceanographers also conduct basic oceanographic research leading to increased understanding of the dynamic processes at work in the oceans. Such knowledge is essential for developing techniques of predicting changes in those ocean characteristics--such as waves, currents, temperature, and the overall marine environment--which are important to the activities of man.

In the Institute for Oceanography, meteorologists and oceanographers will work together to achieve new understanding of the intricate relationships between the ocean and the atmosphere. The atmosphere affects the ocean as much as the ocean affects the atmosphere.

Studies leading toward the understanding and prediction of the affects of waves, tides, and currents on the Continental Shelf and along the coasts also are being undertaken by the Institute.

An oceanographic laboratory, co-located with the Coast and Geodetic Survey Marine Center at Seattle, Wash., is a field facility of the Institute. That laboratory carries out programs in physical and geological oceanography and marine geophysics in cooperation with the Institute's other laboratories and with the Coast and Geodetic Survey.

In addition, the Institute for Oceanography includes two small specialized research groups--one located at the University of Hawaii, and the other at the University of Washington--which have been established so that Institute and university scientists can work closely on problems of mutual interest.

Through the activities of the new Institute, the Coast and Geodetic Survey and its other scientific groups, ESSA expects to learn more about the ocean so that it can provide improved oceanographic services as required by the nation to support its marine operations.

(U. S. Department of Commerce, December 26, 1965.)

"SEA SPIDER" SET IN ATLANTIC TO SERVE AS STABLE OCEANOGRAPHIC BUOY:

In September 1965, the first stable oceanographic buoy, nicknamed Sea Spider, was installed in half-mile deep water off the coast of South Carolina.

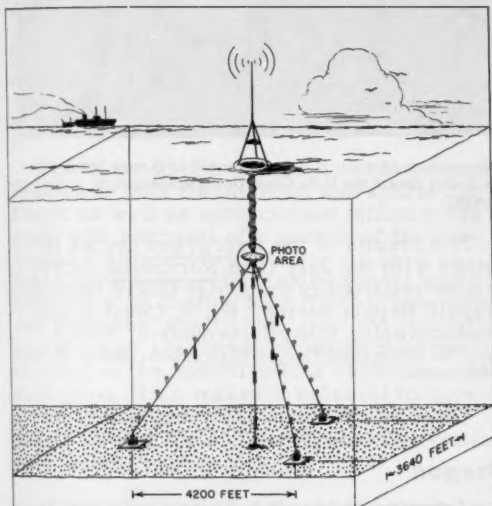


Fig. 1 - Artist's diagram of Sea Spider showing anchoring system.

Sea Spider, designed and installed by scientists of the Woods Hole Oceanographic Institution, Woods Hole, Mass., is a saucer-shaped aluminum float securely held to the ocean bottom by four long steel cables. Various instruments and buoyant hollow glass spheres are attached along the spider-leg cables and the saucer, which is placed 110 feet below the ocean surface to avoid buffeting by wind or waves.

A telemetering buoy at the sea surface transmits data collected from those instruments by radio to a nearby oceanographic vessel.

The structure will give oceanographers their first virtually motionless reference point and instrument support in the deep ocean. It is far more stable and reliable than other sea-measuring instruments, which are usually suspended or towed from surface ves-

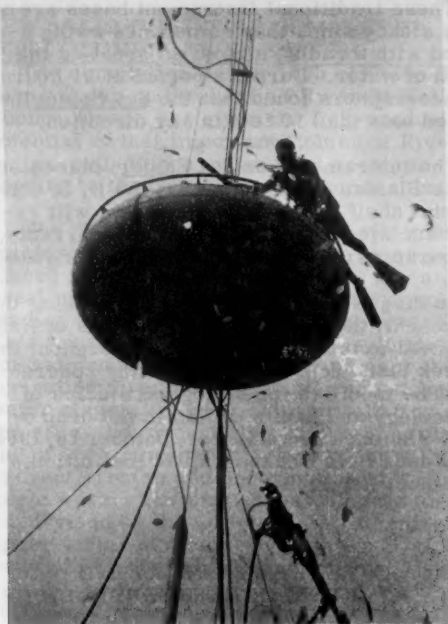


Fig. 2 - Shows aluminum sphere of Sea Spider anchored 110 feet below the surface.

sels or are attached to buoys anchored by a single cable.

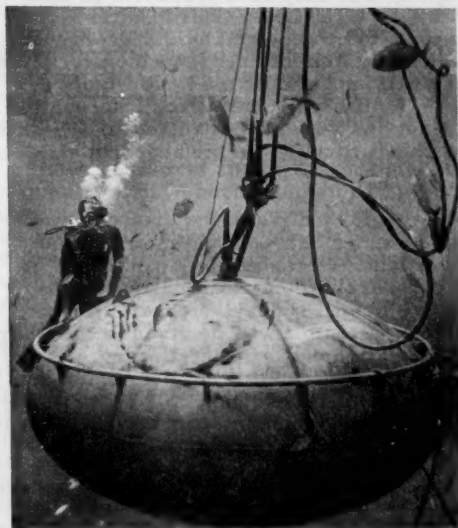


Fig. 3 - Closer view of topside of Sea Spider.

These traditional instrument bases are not very steady since they sometimes swing around with a radius almost as great as the depth of water. During a period of 21 hours, oceanographers found that the Sea Spider buoy moved less than 10 feet in any direction.

The instruments on Sea Spider, placed on Blake Plateau which is part of the U. S. continental shelf in the Atlantic Ocean, will record such measurements as ocean currents, temperature variations, and underwater sounds.

As divers were installing and checking the equipment, they noticed large schools of fish attracted to the spherical buoy throughout the 3-week test. Scientists believe the sphere might be modified for biological studies of the ecology and habits of fish in the deep ocean. (Science News Letter, October 16, 1965, and Woods Hole Oceanographic Institution, September 24, 1965.)

* * * * *

BOUNDARY BETWEEN ARCTIC AND NORTH ATLANTIC OCEANS SURVEYED BY U.S. COAST GUARD CUTTER "EVERGREEN":

The U. S. Coast Guard Cutter Evergreen was scheduled to conduct an oceanographic survey along the boundary between the North Atlantic and Arctic Oceans from Greenland to Iceland to Scotland in October and November 1965. The July 1965 transects in that area by the U. S. Coast Guard Cutter Northwind were to be repeated by the Evergreen. Thus information obtained from the Evergreen cruise will supplement the Northwind's efforts. The itinerary called for 1 occupation of the section between Greenland and Iceland and 4 occupations of the Iceland-Scotland section.

The main objective of the cruise is to study the interchange between the waters of the North Atlantic Ocean and adjacent seas. A field party from the Coast Guard Oceanographic Unit will supervise observations. Particular attention will be given to the study of the variation of northeast-flowing Atlantic water and southwest-flowing Norwegian Sea water between Iceland and Scotland. The accumulation of information in that area is necessary for the study of heat and water exchange and to contribute to a greater understanding of cyclic phenomena in the North Atlantic.



Temperatures of water samples collected in Nansen bottles are recorded aboard the U.S. Coast Guard oceanography cutter Evergreen.

The results of the Evergreen cruise together with the July 1965 Northwind survey will be reported in the Coast Guard Oceanographic Report series. (U. S. Coast Guard Oceanographic Unit, September 9, 1965.)

Note: See Commercial Fisheries Review, Dec. 1965 p. 42, Sept. 1965 p. 40.

Oregon

CHANGES IN FISHERY REGULATIONS ADOPTED BY FISH COMMISSION:

In an effort to streamline and modernize Oregon's commercial fisheries code, the Oregon Fish Commission, at its regular monthly meeting held November 8, 1965, adopted a number of regulation changes, reworded several of its directives, and spelled out definitions of various terms used in regulatory matters.

Among the regulation matters treated by the Oregon Fish Commission were the following:

It was made mandatory for the skipper of each licensed trawl vessel to maintain a log showing details on the landings of fish. The log is to be made available upon request to an authorized representative of the Commission for examination and transcription of information. All data received by the Commission are treated as confidential. The Commission considers that this information is

vital to the proper management of the highly important trawl fishery.

Shad and striped bass regulations on the coastal rivers were defined, with minor changes including elimination of weekend closures in the fishery.

It was made unlawful for commercial fishermen to have in their possession any salmon taken as an incidental catch when fishing under provisions of regulations covering the commercial fishery for shad and striped bass. It was stipulated that any salmon caught in such nets must be returned to the water immediately and with the least possible injury to the fish.

Clarification of a matter that has been of concern to both commercial and sports fishermen as well as enforcement officers was made with approval of a section of the resolution stating that it is illegal to have on board any commercial fishing vessel while fishing for or landing food fish for commercial purposes, any fishing gear not authorized by statute or regulation or which does not conform to the specifications established for such gear. This makes it unlawful to have sport fishing gear aboard a fishing vessel that is fishing for or landing food fish under commercial regulations.

It was also provided that it is unlawful to take or land for commercial purposes any sturgeon over 6 feet in length in the round, or to remove the head or tail of a sturgeon prior to its being initially received at the licensed premises of a wholesale fish dealer or canner.

A variety of other matters were treated under the Resolution adopted by the Commission. Copies of the detailed order, Administrative Order FC 136, are available on request from the Oregon Fish Commission, Portland, Oreg.

In other action, the recommendation that the lower Columbia River seal program be continued at its present level was approved. The \$25 bounty on harbor seals taken in the lower Columbia will be continued and the Commission directed negotiations to continue the contract on seal hunting activities in the lower river at the same level as in recent seasons. (Oregon Fish Commission, Portland, December 9, 1965.)

NEW SALMON FISHWAY COMPLETED FOR COLUMBIA RIVER SYSTEM:

The completion in late 1965 of Sheep Ridge Dam fishway on the Lostine River in Wallowa County, Oreg., has given the fish-producing potential of that important Columbia River system tributary a substantial boost, according to the Oregon Fish Commission.

The Sheep Ridge facility consists of three reinforced concrete retaining walls or sills placed across the full width of the stream creating a staircase arrangement or pools leading to the impounded water above the dam. This arrangement makes it a simple matter for salmon and steelhead to pass over the irrigation diversion structure even at low-water stages. In addition to installation of the sills, the project also involved the placing of rock riprap at the ends of the sills to prevent erosion and undermining of the concrete work. The project was planned and supervised by the Oregon Fish Commission under terms of a contract with the U. S. Bureau of Commercial Fisheries.

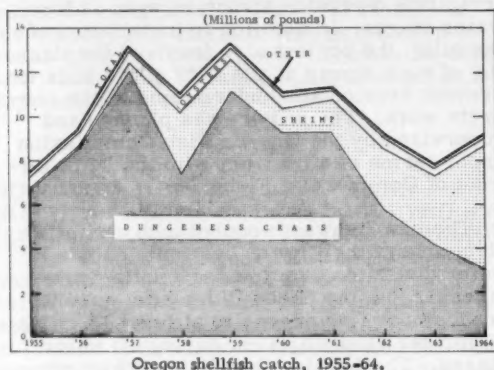
The new fishway, coupled with a similar structure at the City of Lostine's domestic water diversion dam located a mile downstream from the Sheep Ridge site, assures anadromous fish access to at least 15 miles of upriver spawning area during all water stages. The Lostine Dam fishway was completed in March 1963 by an engineering firm under contract with the Oregon Fish Commission. The cost of this project was also provided by the U. S. Bureau of Commercial Fisheries under terms of the Columbia River fisheries development program.

Although runs of spring chinook and steelhead salmon have been maintained in the Lostine over the years, passage of fish has been difficult or impossible during periods of low water. The Fish Commission's Columbia River fisheries management project leader said it is difficult to make any precise prediction as to the effects of the two fishways on the Lostine runs. Improved passage conditions should reduce loss of adult fish by preventing concentration of fish below the dams during low-flow periods when they are more vulnerable to predation and poaching. There has been a small run of silver (coho) salmon in the lower part of the river and it seems likely that ready access will encourage that species to utilize more extensively some of the upstream spawning areas, said the Columbia River fisheries

management. (Oregon Fish Commission, December 13, 1965.)

LANDINGS OF FISH AND SHELLFISH, 1963-1964:

Commercial landings of fish and shellfish in Oregon during 1964 totaled 57.2 million pounds with an ex-vessel value of \$7.0 million--a drop of 7 percent in quantity and 9 percent in value from 1963. The decline was due mainly to a drop in tuna landings. Seven species--flounder, salmon, ocean perch, shrimp, rockfish, tuna, and Dungeness crab--made up almost 93 percent of the 1964 landings.



Salmon: The 1964 salmon landings totaled 9.9 million pounds with an ex-vessel value of \$2.7 million as compared with 1963 landings of 8.3 million pounds valued at \$2.6 million. Silver salmon landings increased in 1964 while king salmon landings declined.

Bottomfish: The 1964 bottomfish landings consisted mainly of 15.4 million pounds of flounder (down 6 percent from 1963), 9.7 million pounds of ocean perch (up 21 percent), and 5.2 million pounds of rockfish (same as in 1963).

Tuna: The Oregon tuna landings were only 4.4 million pounds in 1964 as compared with 11.4 million pounds in 1963.

Shellfish: Shrimp, Dungeness crab, and oysters accounted for about 99 percent of the Oregon shellfish catch. Shrimp landings in 1964 were 5.3 million pounds valued at \$720,000 as compared with 1963 landings of 3.0 million pounds valued at \$263,000. Dungeness crab landings in 1964 amounted to 3.4

million pounds with an ex-vessel value of \$839,000 compared to 4.2 million pounds valued at \$870,000 in 1963. The Pacific oyster harvest in 1964 yielded 334,000 pounds of oyster meats valued at \$106,000, a slight decline from 1963.



Oysters

SUPPLEMENTAL FEEDING OF OYSTERS TESTED:

Ways of feeding oysters commercially, or of supplementing the food of oysters held in ponds, were being tested in 1965 by scientists in marine stations at the Virginia Institute of Marine Science, Gloucester Point, Va., the Bears Bluff Laboratories in South Carolina, and the Florida Board of Conservation Marine Laboratory.

The director of the Virginia Institute of Marine Science stated that the Institute through the work of Dexter S. Haven, head of the Department of Applied Science, has pioneered in basic research leading to these studies as early as 1959. The Institute's director said, "From his work, Haven found that both wheat flour and cornstarch when fed to oysters in quantities as low as 5 parts per million increased the yields or the 'fatness' of oyster meats over that of oysters feeding on natural foods in river water." The results of those studies were reported to scientists in talks presented during conventions in 1961 and 1963 and were published in *Chesapeake Science* in March 1965.

It was stated that Haven anticipates conducting further feeding experiments in 1966 in which oysters will be held in salt-water tanks or ponds where their diet can be supplemented with starch. The outcome of this work will indicate whether or not it may be economically feasible to feed oysters before offering them to the raw bar trade, or possibly to employ supplemental feeding to increase yields in commercial production of oysters.

A scientist of the Bears Bluff Laboratories in South Carolina has for several years explored the use of tidal ponds for oyster culture. He began supplemental feeding of oysters in tanks in 1963. Instead of using starch, he has tested the use of rice chaff and rice, both local products of South Caro-

lina. His preliminary experiments indicate that oysters gain weight when either rice chaff or rice is added to water flowing over them.

During the past two years, a team of scientists at the Florida Board of Conservation Marine Laboratory fed oysters pulverized corn meal as a source of starch, and their reports confirm Haven's earlier studies showing that there is a spectacular increase in the fatness of oysters fed that diet. When asked if he anticipates that the quality and flavor of oysters can be improved with special additives to oysters' natural diet, Haven said that this could only be found out by conducting the experiments which he planned in 1966.

Haven believes that the techniques he has developed for feeding oysters may be useful to biologists who need to hold oysters under laboratory conditions with a minimum flow of river water. Oyster biologists at the Virginia Institute of Marine Science are exploring the use of the technique in keeping oysters in spawning condition throughout the winter by using starch for supplemental feeding. This is contributing to several phases of oyster research now in progress at the Institute's Gloucester Point laboratory. (Virginia Institute of Marine Science, December 15, 1965.)



Salmon

U.S. PACIFIC COAST CANNED STOCKS, DECEMBER 1, 1965:

On December 1, 1965, cannery stocks (sold and unsold) in the United States of Pa-

Table 1 - Total Cannery Stocks of Pacific Canned Salmon, Dec. 1, 1965

Species	Dec. 1, 1965	Nov. 1, 1965	Dec. 1, 1964
	(No. of Actual Cases)		
King	123,126	140,743	94,648
Red	1,902,932	1,983,736	674,711
Coho	193,729	232,458	222,095
Pink	767,120	793,674	1,977,112
Chum	305,471	328,219	782,844
Total . . .	3,292,378	3,478,830	3,751,410

cific canned salmon totaled 2,478,058 standard cases (48 1-lb. cans)--136,811 cases less than on November 1, 1965, and 661,996 cases less than on December 1, 1964, when stocks totaled 3,140,054 standard cases.

On the basis of total stocks of 3,292,378 actual cases (consisting of cans of $\frac{1}{4}$ -lb., $\frac{1}{2}$ -lb., 1-lb., etc.), red salmon accounted for 1,902,932 cases (mostly 1-lb. and $\frac{1}{2}$ -lb. cans) or 57.8 percent of the total cannery stocks on December 1, 1965; pink salmon accounted for 767,120 cases or only 23.3 percent (499,786 cases were 1-lb. talls). Next came chum (305,471 cases, mostly 1-lb. talls), followed by coho or silver (193,729 cases), and king salmon (123,126 cases).

Carryover stocks at the cannery level totaled 733,575 standard cases on July 1, 1965, the approximate opening date of the Pacific salmon packing season. Adding the 1965 new season pack of 3,541,187 standard cases brought the total available supply for the 1965/66 market season to 4,274,762 standard cases.

Shipments at the cannery level of all salmon species from July 1 to December 1, 1965, totaled 1,796,704 standard cases. The carryover of 733,575 standard cases on July 1, 1965, the beginning of the 1965/66 sales year, was substantially lower (37.6 percent) than the carryover of 1,175,588 cases a year earlier.

The 1965 U. S. pack of Pacific canned salmon (including Alaska) of 3,541,187 standard cases was 9.7 percent below the 1964 pack of 3,922,356 cases. By species, the new pack was made up of (1964 pack in parentheses): king, 95,503 standard cases (78,155); red 2,013,077 cases (831,815); coho, 170,064 cases (202,610); pink, 951,688 cases (2,055,311); chum, 310,855 cases (754,465).

Data on canned salmon stocks are based on reports from U. S. Pacific Coast canneries who packed over 94 percent of the 1965 salmon pack. (Division of Statistics and

Table 2 - Total Cannery Stocks on Hand December 1, 1965 (Sold and Unsold), By Species and Can Size

Case & Can Size	King	Red	Coho	Pink	Chum	Total
	(Actual Cases)					
#8 $\frac{1}{4}$ -lb.	6,798	244,715	66,770	4,165	66	322,514
#8 $\frac{1}{2}$ -lb.	99,439	675,335	74,064	234,214	61,817	1,144,869
#8 1-lb.	16,592	976,829	42,839	499,786	234,017	1,770,063
#2 4-lb.	297	6,053	10,056	28,955	9,471	54,932
Total	123,126	1,902,932	193,729	767,120	305,471	3,292,378

Table 3 - Cannery Shipments from July 1, 1965, to December 1, 1965, By Species and Can Size

Case & Can Size	King	Red	Coho	Pink	Chum	Total
	(Actual Cases)					
48 1/4-lb.	7,402	180,333	58,068	4,328	1	250,132
48 1/2-lb.	69,413	307,680	58,484	178,126	32,275	645,978
48 1-lb.	4,139	483,794	65,261	549,851	264,526	1,367,571
12 4-lb.	42	3,406	4,213	28,984	7,050	43,611
Total	80,912	975,213	186,026	761,289	303,852	2,307,292

Economics, National Cannery Association, December 29, 1965.)

Note: See Commercial Fisheries Review, January 1966 p. 46.



South Atlantic Fisheries Explorations and Gear Development

ROYAL-RED SHRIMP GROUNDS OFF FLORIDA COAST SURVEYED:

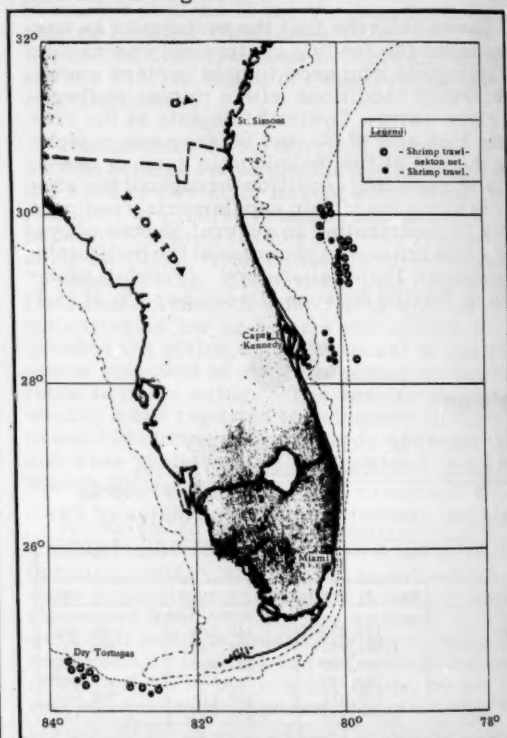
M/V "Oregon" Cruise 105 (November 17-December 3, 1965): A seasonal assessment of the royal-red shrimp (*Hymenopenaeus robustus*) stocks on grounds off St. Augustine, Fla., and the Dry Tortugas was made during this 17-day cruise. Another objective of the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon was to evaluate the related marine life communities of the continental slope area.

During the explorations, trawling transects using 40-foot flat trawls were conducted from 100 to 400 fathoms in each area covered; 65-foot flat trawls were used to determine shrimp abundance where good concentrations were indicated.

On the St. Augustine beds, good catches of royal-red shrimp were made in 185 to 200 fathoms. The best 3-hour drag yielded 125 pounds of heads-off shrimp in 195 fathoms. Ten 3-hour drags on those grounds yielded a total of 490 pounds of heads-off shrimp. Although shrimp ranged widely in size and were larger in deeper water, they averaged 36-40 count throughout the grounds. Catches of 15 to 55 pounds (heads-on) of the Florida lobsterette (*Nephropsis aculeata*) were taken concurrently with royal-red shrimp.

Royal-red shrimp were not located in commercial concentrations off the Dry Tortugas. Temperature transects through that area revealed that ideal bottom temperatures for royal-red shrimp (50° F.) were uniformly distributed between the 150- and 300-fathom curves. Such a condition usually results in

population scatter. Trawling transects from 100 to 400 fathoms bore out this relationship as royal-red shrimp were taken as deep as 340 fathoms. The best catch yielded 15 pounds of heads-off shrimp (21-25 count) in a 3-hour drag using a 40-foot flat net. Shrimp caught off Dry Tortugas averaged a larger size than those off St. Augustine.



Station pattern of M/V Oregon Cruise 105 (November 17-December 3, 1965).

Several drags were made off Cape Kennedy in 28 to 38 fathoms to locate brown shrimp (*Penaeus aztecus*) with catches light and scattered. Large white shrimp (*Penaeus setiferus*) of 16-20 count were taken in 6 to 8 fathoms, averaging 25 pounds of heads-off shrimp per hour drag with a 40' flat trawl.

Deep-water drags in both areas worked yielded small quantities of whiting (*Merluccius albidus*), hake (*Urophycis regius*), and two species of rattails (*Coelorhynchus minimatus* and *Nezumia bairdii*). A large school of unidentified fish 2 to 3 fathoms off the bottom was recorded on the depth-finder in 240 fathoms southwest of Key West during one drag. Off St. Augustine, cancrivorous crab (*Cancer borealis*) were taken in quantities up to 175 pounds per 3-hour drag.

One-meter nekton-net stations yielded several juvenile swordfish (*Xiphias gladius*) and large numbers of juvenile dolphin (*Coryphaena* sp.), mullet (*Mugil* sp.), and lanternfish (*Myctophidae*).

Seven little tuna (*Euthynnus alletteratus*) and 4 skipjack (*Katsuwonus pelamis*) were caught on trolling lines. A few small schools of both species were seen off Cape Kennedy, and a single small school of little tuna was observed off the Dry Tortugas.

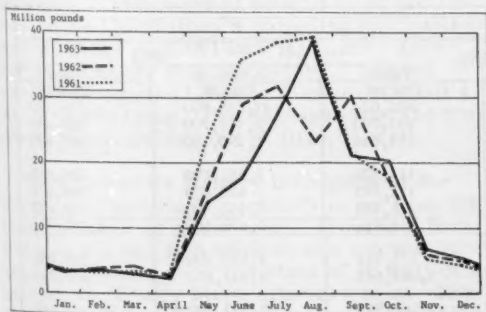
Note: See *Commercial Fisheries Review*, May 1965 p. 37.



Texas

FISHERY LANDINGS, 1964:

Summary: Commercial landings of fish and shellfish at Texas ports in 1964 were 145.1 million pounds with an ex-vessel value of \$29.5 million. That was a drop of 21.3 million pounds and \$539,000 from 1963. Decreased landings in the menhaden and shrimp fisheries were the main reason for the decline.



Shrimp: Texas landings of headless shrimp in 1964 amounted to 41.6 million pounds (66.1 million pounds, heads-on) with an ex-vessel value of \$26.1 million. That was a decrease

of 2.5 million pounds and \$447,000 from 1963. However, Texas remained the top shrimp-producing State and accounted for 37 percent of the quantity and 42 percent of the value of domestic shrimp landings at Gulf of Mexico ports in 1964.

Brown shrimp continued to dominate the annual Texas harvest with 1964 landings of 25.9 million pounds (heads-off) valued at \$16.8 million. The species made up 62 percent of total Texas shrimp landings in 1964 compared with 71 percent in 1963 and 69 percent in 1962. Waters along the Texas coast produced 19.9 million pounds of brown shrimp in 1964 compared with 25.9 million pounds in 1963. Landings of brown and pink shrimp from the high seas off Mexico totaled 9.2 million pounds (heads-off) compared with 7.5 million pounds in 1963. White shrimp landings were the highest on record since the beginning of the collection of detailed shrimp statistics in 1956. The bay systems along the coast produced 51 percent of the 1964 white shrimp catch. No commercial landings of seabob were reported in 1964.

The Brownsville-Port Isabel area accounted for 33 percent of the 1964 Texas shrimp landings; Aransas Pass-Rockport, 23 percent; Freeport, 22 percent; Galveston Bay area, 14 percent; and Port Arthur-Sabine Pass, 8 percent.

The average ex-vessel value of headless shrimp at Texas ports in 1964 was 63 cents a pound compared with 60 cents in 1963 and 77 cents in 1962.

In 1964, U. S. companies had fishing and processing permits in several Central and South American areas. Such activity was on a large scale in both number of vessels engaged and the magnitude of processing capabilities. Foreign operations have become an integral part of the supply complex of the Texas shrimp industry.

Oysters: In Texas the oyster fishery ranked third in volume of landings and second in value in 1964. Fishermen harvested a record 3.4 million pounds of oyster meats valued at \$1.1 million. That was 739,000 pounds greater than the record quantity produced in 1963. The yield of select quality meats from public reefs averaged about two gallons a Texas barrel (296 pounds shell weight). There were no reports of "oyster kill" or meat discoloration during the year. Galveston and

Trinity Bays accounted for 87 percent of the State's total harvest; San Antonio Bay, 8 percent; and the remainder from 3 other areas along the coast. About 275 oyster-dredge units and several tong crews worked in the State for about 5 months during the year.

Blue Crab: In 1964, Texas blue crab landings of 2.5 million pounds valued at \$176,000 were below the 3.0 million pounds valued at \$200,000 in 1963. Production areas shifted to bays in northern Texas with 60 percent of the catch coming from the Galveston-Sabine areas and being trucked to processing plants along the coast. Four regular processors and two smaller plants operated in 1964, although none received the desired volume of crab at any time during the year.

Edible Finfish: Landings of edible finfish in 1964 amounted to 6.4 million pounds valued at \$1.3 million, compared with 6.6 million pounds valued at \$1.3 million in 1963. Red snapper landings in 1964 of almost 2.3 million pounds were only 2 thousand pounds below the record landings of 1908. Landings of spotted sea trout totaled 978,000 pounds valued at \$252,000 compared with 1.2 million pounds valued at \$302,000 in 1963. Black drum landings remained at the 1962-63 level of 1.4 million pounds despite the cancellation of contract drum netting in the Laguna Madre early in 1964. In recent years the closing of more inshore waters to net fishing has caused a general decline in the volume of domestic edible finfish landings.

Vessel Construction: The building of new fishing vessels continued at a rapid pace

throughout 1964 when 64 new vessels were documented in Texas. Some of those vessels were taken to Caribbean and South American countries for use in the shrimp fishery. However, all will maintain U. S. registration and be manned by U. S. citizens. Texas shipbuilders at Aransas Pass, Freeport, Port Isabel, and the Galveston-Port Arthur area have established a "custom-made" trend in shipbuilding with the size, material, and hull design adapted to the individual needs of the purchasers. Vessels to be used as long-range craft were specifically constructed for fishing offshore under adverse conditions.

Thirty-four vessels were removed from documentation in 1964. Most of those were lost at sea. Four Texas vessels were sold and transferred to foreign flags.



Tuna

U.S. PACIFIC COAST ALBACORE FISHING SEASON FOR 1965 ENDS:

Strong southwesterly winds and near-record rainstorms prevailed along the entire West Coast during November 1965. High winds and rough to very rough seas kept the Pacific Northwest albacore tuna fishing fleet tied at dockside.

The 60-degree F. sea surface isotherm remained close to the coast from Cape Mendocino south to Point Conception, and albacore fishing was good off Morro Bay and Davidson Seamount whenever winds and seas

Texas Fishery Landings, 1963-1964

Species	1964		1963	
	Quantity Pounds	Value Dollars	Quantity Pounds	Value Dollars
Fish:				
Menhaden	66,686,400	822,024	83,735,900	1,034,170
Snapper, red	2,249,800	631,200	2,168,700	590,440
Sea trout, spotted	977,700	251,681	1,190,200	301,601
Drum:				
Black	1,409,300	124,508	1,362,700	106,935
Red (redfish)	446,900	111,793	685,600	165,878
Other fish	1,381,800	172,448	1,332,200	158,702
Total Fish	73,151,900	2,113,654	90,475,300	2,357,726
Shellfish:				
Crabs, blue	2,484,800	175,552	2,982,200	199,968
Oysters	3,357,100	1,092,582	2,617,900	913,835
Shrimp (heads-on):				
Brown and pink	47,432,400	18,969,673	55,811,100	21,752,846
White	18,617,100	7,173,287	13,719,500	4,805,748
Other	3,600	1,151	700,800	32,899
Squid	23,500	2,350	37,400	3,884
Total Shellfish	71,918,500	27,414,595	75,868,900	27,709,180
Grand Total	145,070,400	29,528,249	166,344,200	30,066,906

Note: Oysters are reported in pounds of meats (8.75 pounds per gallon). All other species are shown in round weight. The weight of heads-on shrimp was determined by multiplying heads-off weight by the following factors: brown 1.61; pink 1.60; white 1.54, royal-red 1.80; and seabob 1.53.

abated. Landings continued to rise in southern California, and by the end of November totaled 10,730 tons.

Albacore landings at Pacific Northwest ports during the 1965 season were estimated at about 7,500 short tons. Canneries in Astoria, Oreg., took about 6,500 tons; canneries in Seattle, Aberdeen, and Anacortes probably took all of the remainder.

Total albacore tuna landings for the West Coast during the 1965 season were about 18,230 tons, ranking just below the average over the 21-year postwar period. The season could well have been the poorest on record, had it not been for the Pacific Northwest landings, which were among the highest on record since World War II. The California albacore fishery in 1965 was the poorest season since 1947.

Note: See Commercial Fisheries Review, November 1965 p. 36.

RECORD SIZE ALBACORE CAUGHT OFF HAWAII:

The largest albacore tuna known to science turned up during late 1965 in the Honolulu fish auction market in Hawaii. It was a male that weighed a whopping 98 pounds; the previous record was set in 1955 by another male that weighed 93 pounds.

The fish was spotted by a biological technician of the U. S. Bureau of Commercial Fisheries Biological Laboratory at Honolulu. The laboratory technician attends the pre-dawn fish auction daily to sample the Hawaiian catch. "I've worked around albacore before, in the Laboratory's sampling station in Samoa but the minute I saw it, I knew I never saw an albacore that big before," he said. The fish measured 128.4 centimeters (about 4 feet 2 inches) long. The fish was caught by the vessel Ilima, fishing out of Hilo, Hawaii.

What interests fishery biologists at the Bureau's Honolulu Laboratory more than the establishment of a new world record, is the fact that the big fish affords one more clue to the existence near the State of Hawaii of a population of very large albacore tuna. The previous record fish was also caught off Hawaii, and albacore taken in the Hawaiian fishery average larger than those taken in the major fisheries--those off the United States coast and off Japan. According to a fishery biologist at the Bureau's Honolulu Biological

Laboratory, Hawaiian fishermen catch less than 10 tons of albacore tuna a year. About 60,000 tons a year are taken by the Japanese in the Pacific Ocean and about 25,000 tons by the mainland U. S. fisheries.

The Bureau biologist and other scientists have established the fact that the Japanese and American fisheries draw upon a common stock. Albacore tagged off the Pacific northwest have turned up in the Japanese catch. It is the Bureau biologist's theory that the albacore spawn in the tropical Pacific and then migrate to the north temperate Pacific. For several years, they remain in the temperate eastern Pacific or cross the Pacific to mingle with the albacore off Japan. Late in their lives they reach sexual maturity and return to the warm waters of the tropics to spawn. It is this old, spawning stock that the Hawaiian fishery samples, the biologist says. Evidence that the albacore spawn in warm seas comes from finding very young but recognizable albacore in the stomachs of predatory billfish landed near Hawaii.

The age of the record albacore specimen recently caught is estimated at about 14 years. Its weight of 98 pounds far exceeds the Hawaiian average of about 70 pounds, which itself is far above the 20 to 30 pounds of the U. S. and Japanese fisheries. The fish was caught at a depth of about 350 feet.

The record size fish created little stir in the auction market. The fishermen recognized it as being exceptionally large, but said that in the past they had taken even larger ones that were unreported. The fish was auctioned off and wound up that evening on Honolulu dinner tables.



U. S. Fishing Vessels

FISHERIES LOAN FUND AND OTHER FINANCIAL AID FOR VESSELS, OCTOBER 1-DECEMBER 31, 1965:

From the beginning of the program in 1956 through December 31, 1965, a total of 1,728 applications for \$44,070,515 was received by the U. S. Bureau of Commercial Fisheries, the agency administering the Federal Loan Fund. By that date, 896 applications (\$19,612,154) had been approved, 558 (\$13,116,964) had been declined or found ineligible, 229 (\$8,524,758) had been withdrawn by the applicants before

being processed, and 45 (\$784,751) were pending. Of the applications approved, 328 were approved for amounts less than applied for--the total reduction was \$2,031,888.

The following loans were approved from October 1 through December 31, 1965:

New England Area: Raymond F. Stoddard, Portland, Me., \$4,670; Trawler Notre Dame, Inc., Chelsea, Mass., \$50,000; and Manuel F. Roderick, Inc., Stoneham, Mass., \$60,000.

South Atlantic and Gulf Area: Louis E. Wiegand, Miami, Fla., \$15,000.

California: James M. Battle, Eureka, \$6,630.

Pacific Northwest Area: Calvin W., Nellie I., and Caral E. Johnson, Astoria, Oreg., \$23,082; James H. and Leola E. Baumgartner, Coos Bay, Oreg., \$15,000; Kenneth N. Holland, Anacortes, Wash., \$10,092; Edward B. and Myrtle L. Kary, Ilwaco, Wash., \$15,750; Michael J. Carr, Mercer Island, Wash., \$10,751; Herbert O. Bromley, Port Townsend, Wash., \$6,000; and L. H. Chaney, Seattle, Wash., \$9,000.

Alaska: Roman Cabanilla, Cordova, \$8,000; J. A. Rollin, Cordova, \$5,300; Perry C. and Julia R. Coburn, Ketchikan, \$24,000; Harold T. and Mavis Irene Hendricksen, Ketchikan, \$5,000; Philip C. Hoffman, Ketchikan, \$3,500; Charles A. McVicker, Ketchikan, \$9,000; Jones Paul Hotch, Klukwan, \$4,000; Hans Broadland, Petersburg, \$10,000; Neal J. and Jan P. MacDonald, Petersburg, \$29,600; and Paul I. Olson, Petersburg, \$6,000.

Under the Fishing Vessel Mortgage Insurance Program (also administered by the Bureau) during the fourth quarter of 1965, a total of 8 applications for \$635,100 was received. Since the program began (July 5, 1960), 94 applications were received for \$8,564,495. Of the total, 74 applications were approved for \$5,487,187 and 11 applications for \$1,389,900 were pending as of December 31, 1965. Since the mortgage insurance program began, applications received and approved by area are:

New England Area: Received 14 (\$1,646,750), approved 10 (\$1,217,178).

California: Received 2 (\$1,262,000), approved 2 (\$1,262,000).

South Atlantic and Gulf Area: Received 61 (\$3,509,024), approved 53 (\$2,416,939).

Pacific Northwest Area: Received 12 (\$2,071,125), approved 5 (\$526,296).

Alaska: Received 5 (\$75,596), approved 4 (\$64,774).

The first applications for a Fishing Vessel Construction Differential Subsidy under the Bureau's expanded program were received in December 1964. Through December 31, 1965, a total of 55 applications for \$11,638,500 had been received. Public hearings on 34 applications were completed during that period and 8 invitations to bid on a vessel were sent out.



U. S. Foreign Trade

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-December 4, 1965, amounted to 43,649,271 pounds (about 2,078,536 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. That was an increase of 2.0 percent from the 42,801,114 pounds (about 2,038,148 standard cases) imported during January 1-November 28, 1964.

The quantity of tuna canned in brine which could be imported into the United States during the calendar year 1965 at the 12½-percent rate of duty was limited to 66,059,400 pounds (or about 3,145,685 standard cases of 48 7-oz. cans). Any imports in excess of that quota would have been dutiable at 25 percent ad valorem.



Washington

CHANGE PROPOSED IN LEGAL DEFINITION OF COMMERCIAL SALMON TROLLING GEAR:

At a public hearing held in Olympia, Wash., December 18, 1965, by the Washington State Department of Fisheries, proposed changes discussed in the 1966 sport fishing regulations for food fish included a proposal to redefine commercial salmon trolling gear.

It was proposed that the legal definition of commercial salmon trolling gear be changed so that it would be unlawful to troll for salmon commercially with gear that is not permanently fixed or fastened to the vessel. Under the new definition, gear commonly used in salmon angling would not be legal in commercial salmon trolling.

Following public comment on the proposals, final regulations were to be adopted at another public meeting scheduled for December 21. (Washington State Department of Fisheries, December 3, 1965.)

SPORT SALMON FISHERMEN BARRED FROM COMMERCIAL FISHERY:

A new Washington State regulation makes it unlawful to troll for salmon commercially with gear that is not fixed or fastened to the vessel.

The new regulation is designed to close what might be called a "loophole," through which the 3-fish limit for Washington sport salmon fishermen could be circumvented by the device of obtaining a commercial trollers' license under which the licensee could take as many salmon as he wished.

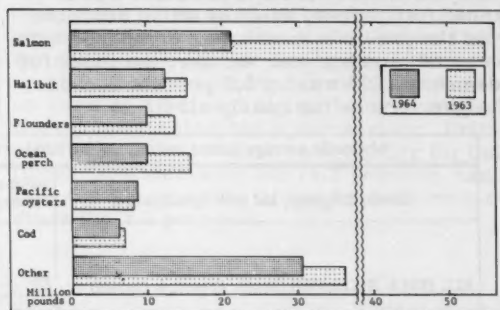
"The practice of catching salmon on sport gear and selling them," the Director of the Washington Department of Fisheries said, "is growing at a rapid rate and if not curtailed now would soon create a severe management problem. This growth includes all sizes of 'comm-sport' boats, including the large, modern sport charter vessels which carry thousands of anglers each year. Our goal is to make available to our citizens the maximum sustained benefits from the fisheries resource. We feel that the primary product of our sport fishery is recreation and adherence to the 3-fish bag limit in the recreational fishery brings about sharing of the sport catch among greater numbers of the angling public. . . . Under the new regulation, the serious small-boat commercial troller may continue fishing by switching to the use of fixed gear."

LANDINGS OF FISH AND SHELLFISH, 1963-1964:

The 1964 commercial landings of fish and shellfish in Washington State totaled 100.9

million pounds with an ex-vessel value of \$15.6 million, a decline of 33 percent in quantity and 27 percent in value from 1963. Salmon was the leading species in 1964, followed by halibut, flounder, ocean perch, and Pacific oysters.

Salmon: The 1964 salmon catch in Washington totaled 21.3 million pounds valued at \$6.5 million, a drop of 61 percent in quantity and 42 percent in value from the previous year. The decline was due mainly to an off-cycle year for pink salmon in 1964 and a light catch of sockeye salmon. Also, the catch of king salmon declined from 6.4 million pounds in 1963 to 5.6 million pounds in 1964. But the catch of silver salmon jumped from 6.1 million pounds in 1963 to 9.4 million pounds in 1964. The chum salmon catch amounted to about 3.1 million pounds in both years.



Washington landings of fish and shellfish, 1964 and 1963.

Halibut: The 1964 landings of halibut in Washington (by United States fishermen) totaled only 12.1 million pounds valued at \$2.3 million as compared with 15.4 million pounds valued at \$2.7 million in the previous year.

Bottomfish: The otter-trawl fleet also reported a general decline in landings of most species in 1964. The 1964 landings included flounder 11.3 million pounds (13.3 million in 1963), ocean perch 11.3 million pounds (15.6 million in 1963), true cod 6.2 million pounds (6.3 million in 1963), and rockfish 5.9 million pounds (8.0 million in 1963).

Shellfish: The 1964 shellfish landings consisted mostly of 8.2 million pounds of oyster meats valued at \$2.2 million (about the same as in 1963) and 5.2 million pounds of Dungeness crab valued at \$1.1 million (down 23 percent in quantity and 21 percent

in value from 1963). The shellfish landings also included small quantities of clams and shrimp.

Note: See *Commercial Fisheries Review*, May 1964 p. 36.



Wholesale Prices

EDIBLE FISH AND SHELLFISH, DECEMBER 1965:

There was a general downward trend in prices from November to December 1965 and the wholesale price index for edible fishery products was down slightly. At 119.3 percent of the 1957-59 average, the overall index in December 1965 was down 0.1 percent from the previous month. The exception to generally lower December prices for fresh and frozen fish and shellfish was in canned fish prices, some of which advanced from the previous month. As compared with the same month a year earlier, the index for December 1965 was up 8.9 percent because of higher prices for nearly all items.

December 1965 prices were down from the previous month for ex-vessel large haddock (down 16.6 percent) and at New York City for fresh round yellow pike (down 8.4 percent). Those lower prices were only partly offset by higher prices at Chicago for Lake Superior fresh whitefish (up 8.7 percent) and a slight increase in prices for frozen western dressed halibut. As a result, the subgroup index for drawn, dressed, or whole finfish dropped 4.0 percent from November to December. As compared with December 1964, the subgroup index for December 1965 was up 11.0 percent. December 1965 prices for all items in the subgroup ranged from high to sharply higher than a year earlier--up 20.2 percent for ex-vessel haddock, 19.2 percent for frozen halibut, and 22.6 percent for Great Lakes whitefish.

In the subgroup for fresh processed fish and shellfish, prices for fresh haddock fillets in December were down 8.4 percent from the previous month. Prices for other items in the subgroup were unchanged. The subgroup index dropped 0.6 percent from November to

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, December 1965 with Comparisons								
Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes (1957-59=100)			
			Dec. 1965	Nov. 1965	Dec. 1965	Nov. 1965	Oct. 1965	Dec. 1964
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					119.3	119.4	118.0	109.5
Fresh & Frozen Fishery Products:					120.6	122.7	121.1	113.8
Drawn, Dressed, or Whole Finfish:					123.4	128.5	131.9	111.2
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.16	.18	119.6	143.4	181.0	99.5
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.48	.48	141.0	140.5	142.0	118.3
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.88	.88	122.3	122.3	117.0	115.6
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.83	.58	93.3	85.8	78.3	76.1
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.71	.78	116.2	126.9	99.9	114.6
Processed, Fresh (Fish & Shellfish):					123.5	124.2	119.1	111.9
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.44	.48	105.7	115.4	119.0	109.3
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.91	.91	106.6	106.6	101.4	105.5
Oysters, shucked, standards	Norfolk	gal.	8.75	8.75	147.6	147.6	141.2	120.1
Processed, Frozen (Fish & Shellfish):					110.6	110.9	107.6	112.8
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.41	101.4	103.9	100.1	92.5
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.40	.40	115.8	117.3	117.3	115.8
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.32	.32	112.2	112.2	107.0	105.2
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.91	.91	107.9	107.3	102.6	113.8
Canned Fishery Products:					117.5	114.0	113.0	102.2
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	27.50	27.00	119.8	117.7	117.7	92.6
Tuna, k. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	12.25	11.56	108.8	102.6	102.6	102.6
Mackerel, jack, Calif., No. 1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.13	7.13	120.9	120.9	120.9	105.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	10.25	10.25	131.5	131.5	121.9	128.3

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

December but was up 10.4 percent from December 1964 principally because of sharply higher prices in December 1965 for standard shucked oysters (up 22.9 percent).



Dressing fish aboard a New England trawler.

Prices for frozen fillets in December 1965 were generally lower than in the previous month. The subgroup index for frozen processed fish and shellfish at 110.6 percent of the 1957-59 average dropped 0.3 percent from the preceding month. Prices were lower than

in November for frozen flounder fillets (down 2.4 percent) and small haddock fillets (down 1.3 percent). Frozen shrimp prices at Chicago were up slightly from the previous month. The subgroup index in December was down 2.0 percent from the same month a year earlier. While prices of some species of frozen fillets were higher than in December 1964, frozen shrimp prices at Chicago in December 1965 were down 4.8 percent from December a year earlier.

The December 1965 subgroup index for canned fishery products rose 3.1 percent from the previous month. Prices for canned pink salmon in December were 1.8 percent higher than in November because of this past season's short pack, and there were indications of a much stronger market for canned tuna (prices up 6.0 percent from November to December). Prices for other canned fish products in the index were unchanged from November. As compared with December 1964, the subgroup index for December 1965 was up 15.0 percent--prices for canned pink salmon were 29.4 percent higher because stocks were more limited than a year earlier. Prices also were higher than a year earlier for California jack mackerel (up 14.2 percent), canned tuna (up 6.0 percent), and canned Maine sardines (up 2.5 percent).



NEW HYDROFOIL CRAFT TO BEGIN PASSENGER SERVICE

A new chapter in maritime history was made in Baltimore, Md., when the forerunner of a fleet of fast, 75-passenger hydrofoil craft hit the water for the first time. Named HS Victoria, the ship can hit 40 knots top speed when "foilborne," and was expected to go into service in fall 1965 between Seattle, Wash., and Victoria, B. C. This past summer she underwent sea trials in Chesapeake Bay.

HS Victoria is 64 feet 9 inches long, has a range of 180 nautical miles and carries a crew of three. Resting on her hull, the craft draws more than 14 feet, but when up on her foils can skim over the surface with a draft of 7 feet 6 inches. The hydrofoil is powered by twin gas turbines.

The new ship, when in passenger service, will make three 75-mile round trips a day. The owners say the vessel is the predecessor to a fleet of such craft planned for operation between major port cities in the United States and abroad.

The basic concept of a hydrofoil is a ship on stilts, 2 aft and 1 forward. Each stilt has a pontoon on the bottom. The ship rests on the hull at slow speeds and rises on the foils as momentum is picked up. The HS Victoria was built by a Baltimore shipyard. (Science News Letter, August 7, 1965.)



FOREIGN

International

CODEX ALIMENTARIUS COMMISSION

THIRD SESSION MEETS IN ROME, OCTOBER 19-29, 1965:

The Third Session of the Codex Alimentarius (Food Standards) Commission met in Rome, October 19-29, 1965. The Commission is sponsored by the Food and Agriculture Organization (FAO) and the World Health Organization (WHO). The joint FAO/WHO program on food standards has as its purpose: (1) simplifying and integrating food standards work now carried on by many international organizations; (2) providing an effective mechanism for obtaining Government acceptance of those standards; and (3) their publication in the Codex Alimentarius.

Important actions at the Third Session of the Commission were (1) the establishment of a Codex Committee on Fish and Fishery Products, and (2) the adoption of a report on "General Principles of the Codex Alimentarius."

Codex Committee on Fish and Fishery Products: The Commission agreed to establish a Codex Committee on Fish and Fishery Products. Norway volunteered to be the host country and to provide the Chairman for the new Committee and was confirmed in that role.

The following terms of reference for the Codex Fisheries Committee were agreed upon: "The Codex Committee on Fish and Fishery Products should elaborate worldwide standards for all fresh, frozen, and otherwise processed fish, mollusks, and crustaceans."

The relation of the Fisheries Committee with other Codex Committees was stated as follows: "The Fisheries Committee will have liaison with the Frozen Foods Committee, as it will have with those for Food Hygiene, Additives, Labeling, and Sampling, and Analytical Methods--but only as to Codes of Practice--not as to the elaboration of the Codex Standards."

Arrangements were made for an orderly transition of work on fisheries standards from the FAO Fisheries Division (previously assigned such responsibility by the Codex Commission) to the new Codex Fisheries Committee. As of January 1, 1966, FAO was to transfer the work, and all files relating to the fish standards drafts, to the Committee.

In an informal discussion between the several fisheries representatives in attendance it was agreed that the first meeting of the Codex Fisheries Committee might be timed to take advantage of the presence in Europe of many country representatives for the Second International Congress of Food Science and Technology at Warsaw, Poland, August 22-27, 1966.

On the agenda at the first meeting of the Codex Fisheries Committee will be the establishment of rules of procedure, patterned after the guidelines already in use by other Codex Committees. It is expected that priorities for particular fishery products Codex Standards can be agreed to, and also assignments of each priority standard to 2 or 3 countries indicating interest in serving as a working group. Those working groups would report back to the full Committee when a Codex Standard had been sufficiently developed to warrant review by that Committee.

General Principles of the Codex Alimentarius: Other action by the Commission at the Third Session included the adoption of a report by the Codex Committee on General Principles which met in Paris, October 4-8, 1965. The report as adopted by the Commission included the following provisions:

GENERAL PRINCIPLES OF THE CODEX ALIMENTARIUS

"Purpose of the Codex Alimentarius: The Codex Alimentarius is a collection of internationally adopted food standards presented in a uniform manner. These food standards aim at protecting consumers' health and ensuring fair practices in the food trade. Their publication is intended to guide and promote the elaboration

International (Contd.):

and establishment of definitions and requirements for foods, to assist in their harmonization, and in so doing to facilitate international trade.

"Scope of the Codex Alimentarius: The Codex Alimentarius is to include standards for all the principal foods, whether processed, semiprocessed, or raw, for distribution to the consumer. Materials for further processing into foods should be included to the extent necessary to achieve the purposes of the Codex Alimentarius as defined. The Codex Alimentarius is to include provisions in respect of food hygiene, food additives, pesticide residues, contaminants, labeling and presentation, methods of analysis, and sampling.

"Nature of Codex Standards: Codex Standards contain requirements for food aimed at ensuring for the consumer a sound, wholesome food product free from adulteration, correctly labeled and presented. In particular, a Codex Standard for a given food product lays down the special requirements for that product, it being understood that the general provisions contained in the Codex Alimentarius shall apply except to the extent otherwise expressly provided for in a specific standard.

"A Codex Standard should, therefore, for any food or foods: (1) incorporate by reference the applicable hygiene, labeling, methods of analysis, and other general provisions adopted by the Commission; and (2) specify in whole or in part the following criteria, as appropriate:

(a) Product designation, definition, and composition--These should describe and define the food (including its scientific name when necessary) and cover compositional requirements which may include quality criteria.

(b) Hygiene requirements--These should include such factors as specific sanitary and other protective measures and safeguards to assure a sound, wholesome, and marketable product.

(c) Weight and measure requirements, such as fill of container, weight, measure, or count of units based on an appropriate method or criterium.

(d) Labeling requirements--These should include specific requirements for labeling and presentation.

(e) Sampling, testing, and analytical methods--These should cover specific sampling, testing, and analytical procedures.

"Acceptance of Codex Standards: A Codex Standard so defined may be accepted by a country--in respect of trade and distribution of the food within its territory--in its entirety, or accepted with a declaration of more stringent requirements, or accepted as a target which will be put into effect after a stated number of years. Acceptance in its entirety or target acceptance would imply an undertaking by the importing country not to hinder within its territorial jurisdiction the distribution of food which conforms to the standard by any legal provisions relating to the health of the consumer or to other food standard matters."

Note: See *Commercial Fisheries Review*, Sept. 1965 p. 55, Dec. 1964 p. 75.

NUTRITION

SEVENTH INTERNATIONAL CONGRESS OF NUTRITION TO MEET IN HAMBURG:

The VIlth International Congress of Nutrition will meet in Hamburg, Germany, August 3-10, 1966. A scientific program covering many aspects of nutrition has been planned. Of particular interest to the fishing industry will be discussions and reports on (1) food habits, food patterns, and food taboos; (2) influence of imported foods on the nutritional status of developing countries; (3) methods of protein evaluation; (4) irradiation of foodstuffs; and (5) food from the sea as related to world nutrition in the future. A wide variety of other topics of general interest will also be presented. Official languages for the Congress will be German, English, and French.



Additional information may be obtained from the VIlth International Congress of Nutrition, Secretariat General, Martinistr. 52, 2000 Hamburg 20, West Germany.

COD

FRANCE HOLDS INTERNATIONAL CONFERENCE ON COD INDUSTRY:

A "First International Congress of the Cod Industry: Tradition and Future" was held in Fecamp, France, January 27-29, 1966, under the sponsorship of the Fondation Française d'Etudes Nordiques. The agenda for the meeting called for a discussion of cod fishing and marketing by European countries, particularly as concerns the North Atlantic fishery. Speakers for the meeting were invited from Norway, Denmark, France, West Germany, Spain, Portugal, the United Kingdom, and the Soviet Union. The cod fisheries in each of those countries were reviewed. The meeting also touched on such subjects as the construction of modern trawlers, international conventions affecting cod fishing, and the market for cod in developing countries. Reports and accounts of the discussions were published by the Fondation Française d'Etudes Nordiques.

EUROPEAN TRADE FAIRS

AMERICAN FISHERY PRODUCTS PROMOTED:

Processed fishery products from the United States were vigorously promoted at two

International (Contd.):

important trade fairs in Europe during January 1966, the U. S. Bureau of Commercial Fisheries announced. The products, many of them new to European markets, were displayed at the International Hotel and Catering Show in London January 18-27, and at the U. S. Food and Agricultural Exhibit in Milan, Italy, January 19-25.

Both fairs were expected to attract many of the leading trade people in Europe, including importers, brokers, agents, and buyers. The London show featured portion control of food, and emphasized servings for institutional use. Food products from all over the world were shown at the London fair. The Milan exhibit displayed only American food and agricultural products.

A feature at London was the preparation of fishery products by an internationally famous chef who used recipes approved in the Bureau's test kitchens.

Both the Bureau and the U. S. fishing industry were highly encouraged by successful participation in European fairs held in 1965 at Cologne, West Germany, and Brussels, Belgium, where fishery products were displayed separately from other foods for the first time.

EUROPEAN FREE TRADE ASSOCIATION

INDUSTRIAL TARIFFS REDUCED
ANOTHER 10 PERCENT:

On December 31, 1965, a further cut of 10 percent was scheduled in the level of tariffs on industrial goods traded among the 8 member countries of the European Free Trade Association (EFTA)--Austria, Denmark, Finland, Norway, Portugal, Sweden, Switzerland, and the United Kingdom. But those fishery and agricultural products listed in Annexes D and E to the Stockholm Convention are not included in the industrial goods category.

The latest EFTA tariff cut was scheduled to bring the general level of EFTA tariffs on industrial goods down to 20 percent of their 1960 level. The final 20 percent is to be e-

liminated by a single cut on December 31, 1966, with the exception that Finland (having become associated with EFTA 1 year after the Stockholm Convention came into force) will reach zero at the end of 1967 through successive cuts of 10 percent at the end of 1966 and 1967.

Those tariff reductions will accomplish the establishment of an industrial free trade area among the EFTA countries three years earlier than originally contemplated by the signatories of the Stockholm Convention. (European Free Trade Association, December 8, 1965.)

Note: See Commercial Fisheries Review, March 1965 p. 61.

FISH MEAL

PRODUCTION AND EXPORTS FOR
SELECTED COUNTRIES,
JANUARY-SEPTEMBER 1965:

Member countries of the Fish Meal Exporters' Organization (FEO) account for about 90 percent of world exports of fish meal. The FEO countries are Chile, Angola, Iceland, Norway, Peru, and South Africa/South-West Africa.

Table 1 - Exports of Fish Meal by Member Countries of the FEO, January-September 1965

Country	September		Jan.-Sept.	
	1965	1964	1965	1964
	... (1,000 Metric Tons). ...			
Chile	3.9	10.2	59.9	108.4
Angola	1/	4.9	2/30.1	42.0
Iceland	14.5	11.4	94.9	89.2
Norway	23.1	9.4	170.7	139.8
Peru	29.8	104.4	1,105.9	1,120.8
So. Africa (including S.-W. Africa)	20.2	23.1	174.9	173.3
Total	91.5	163.4	1,636.4	1,673.5

Table 2 - Production of Fish Meal by Member Countries of the FEO, January-September 1965

Country	September		Jan.-Sept.	
	1965	1964	1965	1964
	... (1,000 Metric Tons). ...			
Chile	0.9	6.2	51.7	109.7
Angola	1/	4.2	2/26.6	39.9
Iceland	20.5	13.4	105.7	99.9
Norway	20.8	19.7	253.7	154.3
Peru	17.1	56.1	910.1	1,065.7
So. Africa (including S.-W. Africa)	11.4	23.7	261.2	236.8
Total	70.7	123.3	1,609.0	1,706.3

1/ Data not available.

2/ Data available only for January-August 1965.



International (Contd.):

Peru accounted for about 68 percent of the 1.6 million metric tons of fish meal exported by FEO countries in January-September 1965.

WORLD PRODUCTION, SEPTEMBER 1965 WITH COMPARISONS:

World fish meal production in September 1965 was down 22 percent from the previous month. Peruvian output was very light following the closed fishing season in August. September production declined seasonally in the United States, Norway, and South Africa.

World Fish Meal Production by Countries, September 1965 with Comparisons

Country	September		Jan.-Sept.	
	1965	1964	1965	1964
 (Metric Tons)			
Canada	11,547	2,985	64,799	39,696
Denmark	11,184	16,620	91,105	86,571
France	1,100	1,100	9,900	9,900
German Fed. Repub.	6,347	6,521	51,214	57,176
Netherlands	516	1,100	4,379	5,800
Spain	1/	1/	2/13,247	1/
Sweden	511	889	5,401	5,300
United Kingdom	5,469	5,185	60,036	58,223
United States	17,811	20,696	178,423	179,747
Angola	1/	6,376	3/26,561	42,073
Iceland	20,508	15,693	105,702	102,245
Norway	20,814	12,257	253,659	146,815
Peru	17,068	49,478	910,090	1,059,070
So. Afr. (including S.-W. Afr.)	11,356	16,581	261,449	231,073
Belgium	375	375	3,375	3,375
Chile	851	10,777	51,696	114,236
Morocco	1/	4,000	2/1,100	17,250
Total	125,457	170,633	2,092,136	2,158,550

1/ Data not available.

2/ Data available only for January-May 1965.

3/ Data available only for January-August 1965.

Note: Japan does not report fish meal production to the International Association of Fish Meal Manufacturers at present.

World fish meal production in January-September 1965 was slightly less than in the first 9 months of 1964. Peruvian output was down 16 percent and Chilean production was also down sharply, but the decline was partly offset by increased production in Norway, Canada, and South Africa.

Most of the principal countries producing fish meal submit data to the International Association of Fish Meal Manufacturers monthly (see table).

MARINE OILS

WORLD PRODUCTION AND EXPORT FORECAST FOR 1966 WITH COMPARISONS:

Total world production of marine oils (whale, sperm whale, fish, and fish-liver oil)

is forecast at 1,120,000 short tons in 1966 as compared with estimated output of 1,190,000 tons in 1965 and 1,198,000 tons in 1964.

World exports of marine oils is forecast at 715,000 tons in 1966 as compared with estimated exports of 805,000 tons in 1965 and 826,000 tons in 1964. (*Fats and Oils Situation*, November 1965, U. S. Department of Agriculture.)

FOOD AND AGRICULTURE ORGANIZATION

EXPANSION IN FISHERIES WORK RECOMMENDED AT CONFERENCE:

Plans to expand and intensify the work of the Food and Agriculture Organization (FAO) in the field of fisheries were approved November 25, 1965, by the major program-review body of its biennial Conference in Rome. The Conference's Commission Two, which examines the technical work of FAO, voted 50 to 6 with 3 abstentions, to raise the present Fisheries Division to departmental status. Its recommendation then was to be voted on by the Conference plenary, which is made up of the same member nations.

The recommendation provides for the first steps in an expansion program to be spread over six years. It also incorporates a proposal for setting up a permanent intergovernmental committee which would deal with such problems as harvesting the resources of oceans and inland waters in such a way that they are conserved for future generations.

The director of the present Fisheries Division is Roy Jackson of the United States, who until 1964 was the Executive Director of the International North Pacific Fisheries Commission.

The recommendations to be presented to the Conference ask the FAO Director-General to convene a technical conference on fisheries for West African countries, and another for the Near East some time in 1966-67. (Food and Agriculture Organization, Rome, November 25, 1965.)

CUBAN PROPOSAL ON FISHING REJECTED AT CONFERENCE:

Cuba urged at the biennial Conference of the Food and Agriculture Organization (FAO) held in Rome, that developed countries "abstain from any interference or harassment" of developing nations fishing in international waters. The recommendation was included

International (Contd.):

in a draft resolution on marine resources submitted to Commission Two of the FAO conference by Cuba's ambassador to the United Nations.

The Commission on November 25, 1965, by a vote of 26 to 10, with 26 abstentions (44 countries were absent), decided that the question raised by Cuba was outside the competence of FAO since it was the subject of an international convention now being ratified under United Nations auspices.

The Cuban draft resolution had recommended that developed countries refrain from making regulations infringing upon "legitimate rights of the developing or emerging countries to exploit international waters adjacent to their territorial seas" but outside the territorial waters of other countries. Cuba's ambassador said he was aware that the proposed resolution was outside the competence of United Nations agencies. However, he said, FAO recognized the potential of marine resources to poor nations, and therefore he was asking the developing countries not to put obstacles in the way of less advanced states. He deplored what he called "political and military reprisals," and said warships should not stop fishing vessels from pursuing their legitimate business. (Food and Agriculture Organization, Rome, November 25, 1965.)

GREAT LAKES

FISHERY PROBLEMS IN THE GREAT LAKES:

Complex fishery situations have arisen in some of the Great Lakes as a result of the decline of the lake trout and other species, and the rise of others such as the alewife. A paper on the problem, using Lake Michigan as an example, was presented before the Management and Research Committee of the Great Lakes Fishery Commission at its 10th Annual Meeting in June 1965 by James W. Moffett, Director of the U. S. Bureau of Commercial Fisheries Biological Laboratory, Ann Arbor, Mich.

The paper states in part:

"Fish populations in the Great Lakes have changed significantly in recent years for one or more reasons. Each change has developed problems of adaptation for that particular group of fishermen accustomed to using the resource in a given lake. . . .

"As an example, let us review some of the changes that have occurred in Lake Michigan. These changes are typical of those elsewhere in magnitude, if not in character, and have been most intensively studied.



Fig. 1 - Fish population changes in Lake Michigan are typical of those in the other Great Lakes.

"The Lake Michigan biological community was an extremely delicate and simple one. It depended upon two predatory species in deep water (lake trout and burbot) to hold in balance a large quantity of diverse converters (chubs, sculpins, and smelt) that were moving energy from planktonic into usable vertebrate forms at a rather rapid rate. With the advent of the sea lamprey in Lake Michigan, the lake trout fishery dropped from roughly 6 million pounds per year to nothing in about five years. The burbot population also declined to insignificance. As the lake trout fishery declined the fishermen, in an effort to stay financially solvent, undertook to fish for chubs and the catch curves literally changed places. Approximately 12 million pounds of chubs were produced annually during the late 1950's to replace the 6 million pounds of lake trout that were no longer available to the fishery. Both the fishery and the continuing sea lamprey predation selected for the largest and most rapidly growing chub species.

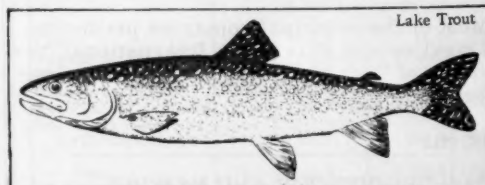


Fig. 2 - Lake Michigan biological community depended upon two predatory species in deep water (lake trout and burbot) to hold in balance a large quantity of diverse converters (chubs, sculpins, and smelt).

International (Contd.):

"This brought about a series of biological events which ultimately resulted in the decadence of the chubs to a single species community--eight species dwindled to what is now about 99 percent one species. The smallest and slowest growing species became dominant because of its undesirability to man and to the sea lamprey. Rough calculations of the poundage of chubs needed to feed the annual production of lake trout (6.0 million pounds) made on a 5 to 1 conversion basis suggested that probably 30 million pounds of chubs were left to reproduce or to be caught. We have no idea of the poundage of chubs that was consumed to maintain the standing crop of lake trout but it must have been considerably larger. There were no substitute predators in the lake to utilize these chubs, neither was there a fishery interested in taking them. Consequently, they increased greatly in number.

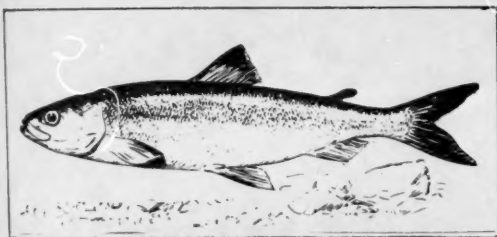


Fig. 3 - About 12 million pounds of chubs were fished annually during the late 1950's to replace the 6 million pounds of lake trout that were no longer available to the fishery.

"At about the same time the alewife, an exotic above Lake Ontario, spread to Lake Michigan where everything seemed to favor its increase. The size of the still growing alewife population overwhelms the imagination. During certain periods of the year 5 to 8 tons of alewives can be caught within 15 minutes in trawl gear. Unfortunately, with such drastic changes coming so quickly, little or nothing could be done with these animals as far as human economy is concerned.

"The fisheries needed to adapt to these changes and some attempts were made. However, the fishermen ran into a series of difficulties, some of which were their own prejudices. Problems arose in re-outfitting, financing of vessels and plants, development of new markets, etc. The advent of the alewife in Lake Michigan eliminated the herring population that supported a very lively fishery. The chub fishery adjusted to large fish for smoking, became plagued with increasing catches of smaller chubs. The costs of labor to clear gill nets of the more abundant but smaller fish soon overcame the small margin of profit. Since there were no predators to hold the alewives or the smaller chubs in check, the lake soon became characterized by a large biomass of useless animals.

"This situation has been about 15 years in the making. The alewife has not yet had its full effect on the populations of Lake Michigan. The chubs are becoming larger and fewer, but it is not yet clear whether this change can be blamed on the alewife. Since the alewife and chubs are both competitors for the same food and space, it is possible that the chubs may suffer the same fate as the herring. It might be necessary to adjust fishing activities to fit this one species. Alewives are becoming so abundant that when they move into shore to reproduce, they are of such den-

ties that they displace even the tenacious yellow perch from their accustomed grounds.

"We turn now to the proposition of re-establishing a predator species like the lake trout in this unfamiliar situation. What are we going to do about it? Are we going to stop all fishing activities in the lake to give the planted lake trout the best chance to survive? If we do this, it means that we lose what is left of the fishery.

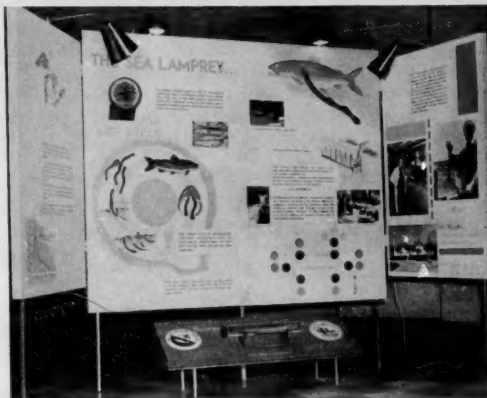


Fig. 4 - Exhibit showing sea lamprey research and control conducted by the U. S. Bureau of Commercial Fisheries under the supervision of its Ann Arbor (Mich.) Biological Laboratory.

"We have now planted about 1.2 million lake trout in Lake Michigan and it is a bit too late for us to speculate any longer. We are faced with the test. What should we do with the trawl fishery? What should we do with the gill-net fishery? What should we do with the trap-net fishery? Do we allow these to continue? What ways do we have to control them or orient them so they have the least effect on the predator we wish to re-establish--a fish which was the keystone in the economics of the fishery? Many other problems will have to be faced. Undoubtedly, we must be astute and as informed as possible because we are not going to approach these questions and find solutions to these problems without stimulating some public emotionalism. The situation is particularly delicate when we compound it with the problem of making work the ultimate introduction of two species of salmon and also possibly the introduction of striped bass.

"It will require all the study we can possibly put forth. It is going to require all the ingenuity we can devise as a group to balance the situation, keep alive an industry capability and at the same time make possible the achievement of some of the basic objectives to the Great Lakes Fishery Commission." (News Release of Ontario Department of Lands and Forests, Toronto, November 12, 1965.)

Note: See *Commercial Fisheries Review*, September 1965 p. 51.

OCEANOGRAPHY

BIOLOGICAL OCEANOGRAPHIC SECTION
SET UP WITHIN THE INTERNATIONAL
UNION OF BIOLOGICAL SCIENCES:

At the XVth General Assembly of the International Union of Biological Sciences (held

International (Contd.):

in Prague in July 1964), a new section on Biological Oceanography was created within the Union. The new section will cover all branches of marine biology. It is designed to function as a scientific association through which marine biologists of all nations can communicate.

A small committee with a Danish scientist as chairman and a British scientist as secretary has been set up to arrange the first meeting of the section which should be held during the Second International Oceanographic Congress in Moscow in 1966.

It was emphasized that the field of biological oceanography is comparatively neglected. It is true that biologists have studied marine plants and animals for a long time, but these studies have very largely been of organisms as component parts of the plant and animal kingdoms. The study of the living communities as an integral part of the sea has by comparison received relatively little attention. That is both an important and challenging field of scientific inquiry which should advance in close cooperation with the physical and chemical aspects of oceanography. (*International Marine Science*, October 1965.)



Aden

NEW STEEL PURSE-SEINER LEADS THE WAY TO MODERNIZATION:

The Department of Fisheries, Federation of South Arabia, has sponsored the construction of the prototype steel purse-seine vessel Federal Star II in an Aden shipyard. This is a breakthrough for the local fishing industry. It has been hailed by local fishermen as a major step in modernizing the Aden fleet which now consists mostly of small wooden vessels. The construction in Aden of another 4 steel fishing vessels similar to the Federal Star II is planned and 2 are already under construction. Building the vessels in Aden saves the high freight costs and other charges of importing fishing vessels.

Initially, the Federal Star II will be used for exploratory fishing in local waters (for tuna, mackerel, and kingfish), and in the training program operated by the Federal Fisheries Department. That training pro-

gram will provide qualified fishermen to operate the new modern vessels being built.



Fig. 1 - Federal Star II ready for launching.

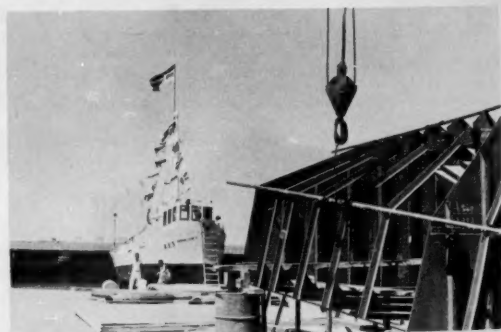


Fig. 2 - With the Federal Star II on launching boards, the Aden shipyard has already started another steel fishing vessel. The hull in the foreground is being built in the inverted position. When the hull plates have been welded, the vessel will be turned upright and completed.

The Federal Star II can be used not only for purse-seining, but also for long-lining, trawling, and other methods of fishing. It is powered by a 60-horsepower diesel engine. The dimensions of the vessel are: length 40 feet, beam 14 feet, depth 6½ feet, and draft at the heel 4½ feet. The vessel measures 35

Aден (Contd.):

gross tons and is of all-steel welded construction with the wheelhouse and main propulsion unit forward. The after part of the vessel is a large working deck with a clear run aft over the wide transom stern for handling purse seine and other nets. The vessel is also equipped with a long-line hauler supplied by a Scottish firm. A power block is to be added to the vessel in the future.

Note: See Commercial Fisheries Review, Feb. 1964 p. 66.



Argentina

JOINT JAPANESE-ARGENTINE
TUNA ENTERPRISE:

The three 270-ton tuna fishing vessels fishing for the joint Japanese-Argentine tuna fishing and processing enterprise (established near Buenos Aires October 1959) in November 1965 averaged catches of about three tons of tuna per day per vessel. The vessels operate in grounds about five days from port and remain at sea for about 40-50 days. They are manned by 25-26 men, including 6-7 Argentines, but the turnover in the Argentine crew is said to be great, with many quitting after their first trip.

The rapid turnover in crew and the expense of hiring and training new fishermen, plus the procurement of fishing equipment from Japan, are reported to be the major management problems faced by that firm. As far as marketing problems are concerned, the Argentines are primarily beef-eating people but that company's canned tuna products are said to be gradually gaining local acceptance.

The joint firm, which is financed on a 50-50 basis (\$247,000 each), has a staff of 10 Japanese nationals working on land and 60 Japanese on the three tuna vessels. (Suis-ancho Nippo, November 25, 1965, and other sources.)



Australia

FISHERY EXPORT TRENDS,
JULY-SEPTEMBER 1965:

Australia's exports of fishery products in July-September 1965 were valued at

A£3,022,000 (US\$6,761,000), up 78 percent from the same three months in 1964. The increased value was due to higher prices paid for frozen spiny lobster tails in foreign markets. Exports of other fishery products during the period were lower than a year earlier.

Value of Australian Exports of Leading Fishery Items,
July-September 1964-65

Product	July-September			
	1965		1964	
	A£1,000	US\$1,000	A£1,000	US\$1,000
Spiny lobster:				
Tails	1,853	4,140	413	923
Whole	179	400	125	279
Total spiny lobster	2,032	4,540	538	1,202
Shrimp	435	972	466	1,041
Scallops	120	268	147	328
Total of products shown	2,587	5,780	1,151	2,571

Note: Australian £1.00 equals US\$2.234.

The export value of frozen spiny lobster tails in September 1965 was only half that of the previous month but the total value for the three months ending in September was 349 percent higher than in the same period of 1964.

The value of shrimp exports was only slightly lower than in the same three months of 1964. Japan continued as Australia's best market for shrimp, with a total of 171,000 pounds valued at £71,000 (\$158,600) shipped in September 1965. South Africa is becoming an increasingly important market for Australian shrimp.

France continued as the principal market for Australian scallops. The export value of that product during the period was downslightly from the same period in 1964.

Australia's exports of canned abalone are increasing, with a total of 239,000 pounds valued at £55,000 (\$122,900) shipped in July-September 1965. Australia's abalone exports near the end of 1965 were valued at £70,000 (156,400). A good part of those exports went to Malaysia and Singapore. (Australian Fisheries Newsletter, December 1965.).

Note: See Commercial Fisheries Review, March 1965 p. 67.



Brazil

CHANGES IN FISHERIES CODE PROPOSED:

A draft revision of the 1938 Brazilian Fisheries Code was published in the Diário Oficial, April 8, 1965. Interested persons were encouraged to submit suggestions concerning its provisions to the Superintendency for Development of Fisheries (SUDEPE).

The chief innovations proposed in the draft legislation and the "General Considerations" which precede the text were: (a) Permission for foreign fishing vessels and foreign fishermen to fish in Brazilian waters, subject to special authorization of the President of Brazil, in order to increase production and train Brazilian fishermen. (b) Studies to facilitate the importation of at least 100 motorized fishing vessels equipped with modern gear, as well as the chartering of foreign vessels for specified periods, since the Brazilian shipbuilding industry is not yet able to provide fishing vessels in the quantity needed. (c) Replacement of the paternalistic "Colonias" of fishermen by new organizations (the Director of SUDEPE favors cooperatives). (d) Conservation of fishery resources through delineation and control of inland and marine fishing areas, prohibition of pollution of those areas, regulation of seasonal fishing periods, vessels, equipment, etc., plus fines ranging from one-tenth to several multiples of the minimum salary for infractions of the Code.

Whereas the previous Fisheries Code restricted commercial fishery activities to Brazilian nationals and to Brazilian-owned vessels (an exception was made for the two Japanese companies which operate in Brazil, based on progressive nationalization of their operations), the draft code would permit foreign participation in Brazilian fishery firms in a ratio of up to 50 percent of the firm capital.

A condition for chartering foreign fishing vessels is that all exports are to be made by the Brazilian firms signing the charter agreements. Discussions were held between officials of SUDEPE and the Foreign Ministry of Brazil concerning proposed arrangements for chartering foreign vessels. (United States Embassy, Rio de Janeiro, April 30, 1965.)

Note: See Commercial Fisheries Review, October 1965 p. 64; June 1965 p. 46.

NATIONAL COMMISSION FOR OCEANOGRAPHY ESTABLISHED:

Brazil has established a National Commission for Oceanography which will include representatives from the Brazilian Ministry of the Navy, Ministry of Agriculture, University of Sao Paulo, and University of Recife. (International Marine Science, October 1965.)



Bulgaria

TRAWLERS TO BE BUILT FOR DOMESTIC AND SOVIET FISHERIES:

Beginning in 1966, a shipyard at Burgas on Bulgaria's Black Sea coast will specialize in the construction of fishing vessels. During Bulgaria's new 5-Year Plan (1966-1970), 220 fishing trawlers are to be produced; of those 120 are to be exported to the Soviet Union which will operate them in the North Sea, the Barents Sea, and the Baltic Sea. Plans call for this new series of trawlers to each have a 300-horsepower engine; a displacement tonnage of 311 tons, and a length of about 30 meters (98 feet). Each trawler is to be able to operate continuously for 19 days without refueling. Every vessel is to have a refrigerated hold with a volume of 100 cubic meters (3,531 cubic feet) maintained at a constant temperature of -4° C. (+24.8° F.). All processing is to be fully mechanized. (Zemedeľsko Zname, November 26, 1965.)

It is believed that the additions to the Soviet fleet from Bulgaria will serve mainly to replace obsolete Soviet trawlers built in the early post-World War II era in East Germany. They will not be used to further expand Soviet Baltic and North Sea operations.



Canada

FEDERAL GOVERNMENT TO ASSIST FISHERMEN FOR CATCH FAILURE:

Details of a Canadian Federal Government program to provide immediate assistance to fishermen who experienced a serious catch failure during the past season were announced December 3, 1965, by Canada's Fisheries Minister. The action implements an announcement on September 27, 1965, by the Prime Minister that the Government has "already taken steps to work out plans to assist the

Canada (Contd.):

fishermen in communities where, by the end of the season, the inshore fishery has been a failure."

The special assistance will be based on records of fishing income supplied by the Unemployment Insurance Commission, but actual payment will be made by the federal Department of Fisheries from money voted by Parliament for that purpose. To be eligible for assistance, a fisherman must have at least five weeks with fishing stamps in his book that were earned in 1965. This shows that he depends on fishing for a substantial part of his income.

A fisherman with no dependents who has five weeks with fishing stamps earned in 1965 but does not have an unemployment insurance entitlement of more than C\$150 in the 1965/66 benefit period will be eligible. Also eligible will be a fisherman with dependents who has five weeks with fishing stamps earned in 1965 but does not have an unemployment insurance entitlement for more than \$200 in the same period.

The amount of special assistance paid by Canada's Department of Fisheries will depend upon the fisherman's initial entitlement to seasonal benefit in the coming winter. If he had dependents he will receive the difference between \$200 and his earned unemployment insurance entitlement to benefit. If he has no dependents he will receive the difference between \$150 and his earned unemployment insurance entitlement to benefit.

The purpose of the program is to supplement the winter income of those fishermen who suffered catch failures in 1965. The supplement of \$200 or \$150 will be made up of the initial unemployment insurance entitlement plus the special assistance which will be available from the Department of Fisheries.

Fishermen who have not made application for Unemployment Insurance benefit this winter (1965/66) because they do not have minimum contributions required for Unemployment Insurance should make such application at a local office of the Commission in the usual way if they have a minimum of five weeks with fishing stamps earned in 1965. Fishermen will not be eligible for the special assistance from the Department of Fisheries

unless they have made an application for Unemployment Insurance benefit prior to March 26, 1966.

FEDERAL DEPARTMENT OF FISHERIES SETS UP NEW CONSERVATION AND PROTECTION SERVICE:

A new Director of the new Conservation and Protection Service of Canada's Federal Department of Fisheries was appointed in December 1965. The new service was created from the former Conservation and Development Service, along with the new Resource Development Service. The Conservation and Protection Service will be responsible for the administration and operation of programs designed to protect and maintain stocks of fish through regulation of fishing and to carry out and expand those activities which were originally the responsibility of the Protection Branch of the former service. (Canadian Department of Fisheries, Ottawa, December 23, 1965.)

GOVERNMENT SPONSORS NEW COMMUNITY FISH PROCESSING CENTERS IN NEWFOUNDLAND:

Plans to spend about C\$700,000 in Newfoundland to provide additional collection depots for fresh and frozen fish and community processing centers for salt fish were announced jointly December 23, 1965, by the Canadian Federal Fisheries Minister and the Newfoundland Minister of Fisheries. This is a continuation of an assistance program begun in 1965. In 1966, the emphasis will be on building collection centers for the frozen fish trade. The program of new construction is part of the arrangements entered into by the Governments of Canada and Newfoundland to accelerate fisheries development activity. The Federal Government will meet the cost of the buildings, including supporting marine works, and the Province will undertake responsibility for making building sites available and assuring normal maintenance and operation of the facilities. (Canadian Department of Fisheries, Ottawa, December 23, 1965.)

Note: See Commercial Fisheries Review, May 1965 p. 60.

ATLANTIC OFFSHORE FISHING VESSEL CONFERENCE:

Hydrodynamic tests were conducted during late 1965 at the Canadian National Research

Canada (Contd.):

Council's laboratories in Ottawa on three hull models of a Canadian-designed stern trawler for deep-sea Atlantic fishing. The tests will provide the necessary information for a final design of a trawler hull which will be suited to specific demands of a Canadian vessel entering the highly competitive offshore trawl fishery on the Northwest Atlantic. The hulls were designed by naval architects to meet requirements called for by the Industrial Development Service of the Canadian Federal Department of Fisheries.

the economic and other problems involved in their operations, and development of the fisheries generally. (Canadian Department of Fisheries, Ottawa, December 6, 1965.)

* * * * *

BRITISH COLUMBIA CANNED SALMON PACK, 1960-1965:

The 1965 pack of canned salmon in British Columbia of 912,796 cases was the smallest since 1960. The 1965 pack was down 27 percent from 1964 due mainly to a light pack of

British Columbia Canned Salmon Pack, 1960-1965

Species	1965	1/1964	1/1963	1/1962	1/1961	1/1960
(Standard Cases--48 1-Lb. Cans)						
Sockeye	245,794	343,359	158,375	297,717	398,236	226,912
Spring (king)	18,886	9,127	10,000	7,174	7,927	5,935
Steelhead	841	1,262	771	815	979	530
Blueback	21,188	36,259	11,384	12,097	12,527	23,345
Coho (silver)	273,219	168,473	146,099	175,638	234,047	69,237
Pink	287,662	464,107	757,452	1,188,661	661,458	219,658
Chum	65,206	232,721	119,190	134,483	95,400	87,884
Total	912,796	1,255,308	1,203,271	1,816,585	1,410,574	633,501

1/Revised.

Source: Canadian Department of Fisheries.

Sea-keeping qualities are not the only demands to be made on the eventual prototype of the vessel which is envisaged. Deck layout and machinery will provide for the most efficient fish and gear handling, and special attention will be given to safety factors and living and working conditions for the crew.

Canadian shipbuilders, naval architects, and the fishing industry had an opportunity to learn more about this vessel at the Canadian Atlantic Offshore Fishing Vessel Conference held in Montreal February 7-9, 1966. The final model was to be the subject of three papers, one considering it from a naval architect's viewpoint, another on its performance hydrodynamically, and the third from the viewpoint of fishing operations. More than 30 other papers were presented at the conference on many phases of the Northwest Atlantic fisheries.

The Conference was sponsored by Canada's Federal-Provincial Atlantic Fisheries Committee, which is made up of Deputy Ministers of Fisheries of the Federal Government and the governments of the five Atlantic coast provinces. Fisheries specialists from Canada, the United States, and Europe attended. Discussed were construction, design and equipment of deep-sea fishing vessels,

pink and chum salmon. Disappointing spawning runs of those species caused early closures on the fishing grounds and reduced supplies available to canneries.

Note: See Commercial Fisheries Review, Feb. 1965 p. 52.

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AMENDMENT OF LICENSING SYSTEM FOR COMMERCIAL FISHERIES IN BRITISH COLUMBIA PLANNED:

The Canada Department of Fisheries has announced that major changes will be made in 1966 in the British Columbia commercial fisheries licensing system. These will include an increase in the price of personal commercial fishing licenses and a system of licenses for individual fishing vessels. Additional changes are also under consideration.

Final details of the new system have not been completed. In the interim, the following procedures will apply in British Columbia. All holders of valid 1965 commercial fishing licenses will be allowed to operate under those licenses and without further payment or validation until March 31, 1966. All new applicants, and this includes everyone not covered by a 1965 license, will be issued a commercial fishing license for the usual fee and this license will be good from date of issue until

Canada (Contd.):

March 31, 1966. (Canadian Department of Fisheries, Vancouver, December 1, 1965.)

**BRITISH COLUMBIA HERRING FISHERY
LABOR DISPUTE SETTLED:**

After having been tied up by a labor dispute since October 16, 1965, British Columbia herring fishermen reached an agreement with processors on December 1, 1965. Terms of the agreement call for the payment of C\$17.40 a short ton for herring landed during the 1965/66 season. (The fishermen had been getting \$14.48 a ton and had asked for \$20.48 a ton.) The agreement also called for the payment to a fishermen's health and welfare plan of 20 cents for each ton of herring landed (an increase of 10 cents a ton). However, the settlement did not provide for other fringe benefits--such as a pension plan and paid vacations--that the fishermen were seeking.

Good herring catches were reported when fishing was resumed in early December 1965.

**ONTARIO'S FISHERY RESEARCH
PROGRAM ON LAKE ERIE:**

Several field stations for carrying out fisheries research in the Province of Ontario have been established by that Province's Research Branch of the Department of Lands and Forests. The station's are located in various parts of Ontario and serve the need for individual studies on the most important species of fish, as well as the need for understanding the fish population dynamics in the Province's larger bodies of water. The Lake Erie Fisheries Research Station is at Wheatley in western Lake Erie, but studies are conducted in all parts of the lake, either from that base or the field laboratory at Port Dover in eastern Lake Erie. Scientists at that station are studying the fish populations in Lake Erie in order to understand why major fluctuations and drastic changes have occurred. The information that will provide this understanding will also form the basis for subsequent management proposals designed to minimize population fluctuations, while providing the best possible utilization.

The research data sought by the staff of the Lake Erie Fisheries Research Station come from observations and samples obtain-

ed from the lake from several sources. Research programs utilizing special and standard fishing and sampling gear provide data to answer particular questions. Routine "index" fishing provides a standard measure of the numbers of various species present from year to year. Trips with fishermen and samples of their catch provide estimates of the current fish populations being utilized. This latter information, when related to the commercial catch statistics, provides the only real estimate of a species abundance now available.

Most of the data on Lake Erie is collected from the research vessel *Keenosay*, a 50-foot steel vessel built especially for this work. The vessel, with a crew of three, is capable of navigating and operating in all parts of Lake Erie, and in all but the most severe weather conditions. The vessel may leave for a day's operation before sunrise, fish with any of several different standard or special fishing gear, and return to harbor in the late afternoon. Information is collected on the numbers and amounts of various species present, as well as samples of individual fish for laboratory study, and information on the size and sex of the fish. They also record water transparency, water temperatures, and lake conditions. Occasionally they are required to carry out prolonged operations traveling to all parts of the lake including United States waters. Occasionally the vessel is required for operations that must be carried out continuously over a 24-hour or longer period.

For every hour spent in collecting and recording information, there is an equal or greater effort required for analyzing, interpreting, and reporting on the results. This requires adequate shore facilities including a cooler-freezer, a fish-examination laboratory, a microscopy and a chemistry laboratory, a fish-scale reading room for aging the fish, as well as equipment to store, handle, and process large quantities of data. A new laboratory and office is being provided for the Lake Erie Fisheries Research Station at Wheatley. The new laboratory will have all those facilities and others required for analyzing and reporting on the data and for storing and maintaining the research vessel and gear. (Ontario Department of Lands and Forests, Toronto, November 25, 1965.)

Canada (Contd.):

INDUSTRIAL PRODUCTS PRODUCTION, USE, AND FOREIGN TRADE, AUGUST 1964-JULY 1965 WITH COMPARISONS:

Marine Oil: In the marketing year August 1964-July 1965, Canadian imports of marine oils were down, but domestic production was 38 percent greater than in the preceding 12 months. Exports showed little change. Most of the 1964/65 Canadian output was produced in the latter part of 1964, because herring oil output in the first 7 months of 1965 was only 346,000 pounds as compared to 10.2 million pounds in the first 7 months of 1964.

Table 1 - Canadian Production and Foreign Trade in Industrial Products, August 1964-July 1965 with Comparisons

Item	Production	Imports	Exports
 (1,000 Pounds)		
Marine Oils^{1/}:			
August 1964-July 1965	84,629	2/2,027	18,450
August 1963-July 1964	61,140	3,187	18,222
 (Short Tons)		
Fish Meal:			
August 1964-July 1965	82,356	3/3,907	55,828
August 1963-July 1964	80,459	2,182	61,530
^{1/} Conversion factor: 9.25 pounds per imperial gallon.			
^{2/} Partly estimated.			
^{3/} Data available only for August 1964-May 1965.			

Wholesale prices (f.o.b. Toronto) for British Columbia herring oil were 10.2 Canadian cents a pound in August 1964, 10.7 cents in September 1964, 13.1 cents in December 1964, 12.9 cents in March 1965, 12.2 cents in June 1965, and 11.5 cents in September 1965.

With fish oil prices at a high level, there were heavy substitutions of soybean oil for marine oil in margarine production. The use of marine oils in Canadian margarine fell from 44.0 million pounds in marketing year 1963/64 to 28.7 million pounds in 1964/65.

Table 2 - Canadian Exports of Fish Meal by Country of Destination, August 1964-July 1965 with Comparisons

Product and Country of Destination	Aug. 1964-July 1965		Aug. 1963-July 1964	
	Quantity	Value	Quantity	Value
	Short Tons	C\$1,000	Short Tons	C\$1,000
Herring and Pilchard Meal:				
United Kingdom	2,410	358	2,132	283
United States	38,998	6,054	48,404	6,884
Total herring and pilchard meal	41,408	6,412	50,536	7,167
Other Fish Meal:				
United Kingdom	11,064	1,515	8,088	1,008
United States	2,966	405	2,666	311
Other countries	394	54	235	32
Total other fish meal . .	14,424	1,974	10,989	1,351

Fish Meal: In the August-July period of 1964/65, Canadian production of fish meal was up slightly from the preceding 12-months period, but exports were down due to a decline in shipments of herring meal to the United States. (United States Embassy, Ottawa, October 15, 1965.)

Note: See *Commercial Fisheries Review*, July 1965 p. 62; Dec. 1964 p. 84; Aug. 1964 p. 56.

**Colombia****JAPAN-COLOMBIA JOINT TUNA ENTERPRISE PROPOSED:**

A Japanese fishing company, a subsidiary of another fishing company, together with a trading firm, hopes to establish a joint tuna fishing enterprise in Colombia. The Colombian Government is reported as looking favorably on the plan which was initially broached two years ago. Reportedly, the joint company will operate purse-seine vessels to fish for yellowfin tuna. (Suisan Keizai Shimbun, November 25, 1965.)

Note: The same firm is also involved in a joint trawling shrimp enterprise established October 1963 in the Malagasy Republic.

**Denmark****EXPORTS OF FISHERY PRODUCTS AND BYPRODUCTS, JANUARY-SEPTEMBER 1965:**

Exports to All Countries: Denmark's total exports of fishery products and byproducts to all countries in January-September 1965 to-

Table 1 - Danish Fishery Products Exports to all Countries, January-September 1965 with Comparisons

Products	1/ Jan.-Sept. 1965			Jan.-Sept. 1964		
	Quantity	Value		Quantity	Value	
	Metric Tons	1,000 Kr.	US\$ 1,000	Metric Tons	1,000 Kr.	US\$ 1,000
Fish:						
Fresh	132,897	276,296	40,063	139,967	250,856	36,374
Frozen	35,545	158,968	23,050	34,691	127,346	18,466
Salted	3,208	13,568	1,967	2,442	13,900	2,000
Smoked	514	7,591	1,101			
Canned:						
Fish	4,055	15,937	2,311	4,162	15,800	2,300
Shellfish	1,338	10,903	1,581	902	7,100	1,000
Semipreserved Products:						
Fish	1,358	9,432	1,368			
Shellfish	679	4,726	685	1,638	10,200	1,500
Other Products:						
Fish meal, scales, ensilage, and trout food	72,558	77,844	11,287	55,690	52,030	7,544
Total	252,152	575,265	83,413	239,512	477,232	69,184
Fish oil^{2/}	40,721	55,288	8,017	18,161	21,197	3,074

^{1/}Preliminary data from the Ministry of Fisheries.

^{2/}Fish oil data are shown separately as they are collected by another Ministry and often are delayed.

Note: One Danish krone equals US\$0.145.

Denmark (Contd.):

taled 252,152 metric tons valued at 575 million kroner (US\$83.4 million). As compared with the same period in 1964 this was an increase of 5 percent in quantity and 21 percent in value. Exports of fresh fish were down 5 percent in quantity but were up 10 percent in value; exports of fresh whole herring and flatfish fillets were lower. Exports of frozen fishery products were up 2 percent in quantity and 25 percent in value. Better

prices were received for exports of most frozen fish. Other major fishery products were up both in quantity and value except canned fish which showed little change. Exports of semipreserved fish and shellfish (canned or jarred) were up considerably. Danish caviar, made from lumpsucker roe, is the most important semipreserved product. A single Danish company is responsible for more than half of the world production of that product, exporting it to more than 60 countries.

Exports of fish meal during the first 9 months rose from 43,000 tons in 1964 to almost 53,000 tons in 1965 and the value was up from nearly 46 million kroner (\$6.7 million) to 67 million kroner (\$9.7 million). Danish fish meal production increased in 1965 and markets were good. Exports of fish oil were up 83 percent in quantity and 117 percent in value from the same period in 1964.

Exports to the United States: Exports of Danish fishery products to the United States in January-September 1965 rose 61 percent in quantity and 57 percent in value from the same period a year earlier. Exports of cod fillets, mostly in the form of frozen blocks, were up 90 percent in quantity and 140 percent in value. United States buyers of frozen fish blocks were reluctant to contract early in 1964 but the situation changed in 1965. Prices for cod fillets in 1965 averaged about 25 percent higher. Exports of pond trout to the United States continued high—up 69 percent in quantity and 29 percent in value from the same period a year earlier, but the average price of those exports was down about 24 percent. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, December 8, 1965.)

Note: See Commercial Fisheries Review, October 1965 p. 70; February 1965 p. 44.



Ecuador

JAPAN-ECUADOR TUNA ENTERPRISE PLANNED:

A Japanese firm plans to establish a joint tuna fisheries enterprise in Ecuador. The joint company, to be located at Guayaquil, Ecuador, is expected to commence operations with two tuna vessels. (Suisan Keizai Shim-bun, November 25, 1965.)

* * * * *

Table 2 - Value of Danish Exports of Fishery Products by Groups and Major Countries, January-September 1965 with Comparisons

Destination	1/Jan.-Sept. 1965 Jan.-Sept. 1964			
	Value			
	1,000 Kr.	US\$ 1,000	1,000 Kr.	US\$ 1,000
By Groups:				
Common Market (EEC) . . .	250,400	36,308	207,000	30,015
European Free Trade Assn. (EFTA - including Finland) . . .	242,800	35,206	198,000	28,710
East Bloc countries	23,200	3,364	22,000	3,190
Other countries	58,900	8,541	50,000	7,250
Total	575,300	83,419	477,000	69,165
Major Importers by Country:				
West Germany	165,000	23,925	129,000	18,705
United Kingdom	106,000	15,370	97,000	14,065
Sweden	81,000	11,745	59,000	8,555
Italy	37,000	5,365	33,000	4,785
Switzerland	37,000	5,365	30,000	4,350
United States	30,000	4,350	19,000	2,755

1/ Preliminary data from the Ministry of Fisheries.

Table 3 - Danish Exports of Fishery Products and Byproducts to the United States, January-September 1965 with Comparisons

Product	1/Jan.-Sept. 1965			Jan.-Sept. 1964		
	Qty.	Value		Qty.	Value	
		Metric Tons	1,000 Kr. US\$ 1,000		Metric Tons	1,000 Kr. US\$ 1,000
Fresh & frozen:						
Pond trout	587	3,461	502	346	2,685	389
Other trout & salmon	50	492	71	-	-	-
Trout eggs	1	89	13	1	75	11
Flatfish 2/	156	1,590	231	227	2,020	293
Fillets:						
Cod	4,096	16,226	2,352	2,154	6,729	976
Other	7	29	4	90	393	57
Norway lobster	112	3,039	441	160	3,105	450
Total	5,009	24,926	3,614	2,978	15,007	2,176
Cured products:						
Salted & smoked 3/	9	66	10	27	103	15
Canned products:						
Sprats & herring	440	2,258	327	434	2,133	309
Shrimp	92	1,021	148	93	950	138
Mussels	97	472	69	46	277	40
Other	27	199	29	25	157	23
Total	656	3,950	573	598	3,517	510
Semipreserved products	24	282	41	12	153	22
Fish solubles	600	642	93	300	284	41
Grand Total	6,298	29,866	4,331	3,915	19,064	2,764

1/ Preliminary data from the Ministry of Fisheries.
2/ Mostly turbot, brill, plaice, and sole.
3/ Mostly cod, salmon, trout, and eels.

Ecuador (Contd.):

FISHING FLEET STATUS, 1964:

The development of the domestic tuna and groundfish industry is being emphasized by the Ecuadorean Government's National Economic Planning and Coordination Board. This coincides with a growing interest on the part of United States investors in the Ecuadorean fishing industry. The following report gives an indication of the country's fisheries base:

Tuna: The Ecuadorean tuna fleet increased by 7 units in 1964 to a total of 51 vessels. Most of those have a limited range and concentrate their activity around the port of Manta and the Santa Elena peninsula when tuna are running. The average characteristics of those vessels are: length overall 14 meters (46 feet), 46 gross tons, 144 horsepower, and estimated value US\$14,200.

As of summer 1965, 4 tuna purse-seine vessels were operating, of which 3 (with capacities of 50 to 80 tons each) belonged to a large cannery operated at Manta by United States interests. Another United States group was reported to be setting up a plant at Manta to freeze tuna for export to Puerto Rico.

Shrimp: Ecuador's annual shrimp landings have leveled off at about 5,000 metric tons (live-weight basis) in recent years. Most of those landings are frozen for export mainly to the United States. The average characteristics of the 160 vessels in the Ecuadorean shrimp fleet were reported in December 1963 as follows: length overall 15 meters (49 feet), 163 horsepower, and estimated value \$19,600.

Improved refrigeration and net-handling equipment are being installed on some of the shrimp vessels, but a large part of the shrimp fleet still lacks the gear and refrigeration equipment which would permit fishing off the coast in waters of 30 fathoms or more.

Groundfish: The 9 vessels in the Ecuadorean groundfish fleet at the end of 1964 averaged 17 gross tons, 84 horsepower, and had an estimated average value of \$10,800.

Miscellaneous: In 1962, it was estimated that Ecuador had over 14,000 small independent fishermen in 209 fishing communities working mostly from small nonpower-driven craft. They used various kinds of nets (drag,

surf, trammel, stake, and casting), as well as harpoons and fishing lines. (United States Consulate, Guayaquil, December 10, 1965, and other sources.)

Note: See *Commercial Fisheries Review*, Dec. 1965 p. 54; and Aug. 1965 p. 71.



France

TUNA EX-VESSEL PRICES AND IMPORT QUOTAS SET FOR WEST AFRICAN 1965/1966 SEASON:

Duty-free quotas for canned tuna entering France from its former West African colonies are established each year. Ex-vessel prices are also set for tuna landed at canneries in West Africa by French-operated vessels.

The ex-vessel prices and quotas for the 1965/66 West African season (which opened November 1, 1965, for yellowfin) were reported in *Le Moniteur Africain* as follows:

Prices: 1.65 francs a kilo (US\$330 a metric ton) for yellowfin tuna weighing at least 3 kilos (6.6 pounds) and big-eyed tuna weighing from 3 to 35 kilos (6.6 to 77 pounds).

1.10 francs a kilo (\$220 a metric ton) for yellowfin and big-eyed tuna weighing less than 3 kilos, and skipjack weighing at least 2.5 kilos (5.5 pounds).

The proportion of skipjack in relation to the total tuna landed is fixed at 15 percent. Fishermen will receive, in addition, a bonus of 0.10 francs a kilo (\$20 a metric ton) for skipjack delivered to the factories.

The French tuna fleet scheduled to operate off West Africa in 1965/66 is about the same as in the previous season.

Quotas: France has reduced the quantity of canned yellowfin tuna that may be imported duty-free from West Africa. (The quotas are set on the basis of raw tuna canned.) For canned yellowfin, the 1965/66 French duty-free quotas (raw tuna weight) are 10,000 tons for Senegal, 1,600 tons for the Ivory Coast, and 400 tons for the group consisting of Mauritania, Congo-Brazzaville, and Malagasy Republic. Compared with the previous season, that is a cut of 1,000 tons for Senegal and 600 tons for the Ivory Coast.

France (Contd.):

In Senegal, where 7 tuna canneries were in operation until 2 years ago, there are now only 3 plants in operation. The Government of Senegal, however, is planning an ambitious expansion of its tuna industry, largely with the aid of the U.S.S.R., which in 1964 granted a \$6.7 million loan for fisheries development. Senegal's 4-Year Plan calls for reducing its canned tuna exports to France to 5,000 tons (fish weight) in 1969, and increasing its exports to countries outside of the Franc Zone to 25,000 tons.

In the case of the Ivory Coast, the reduction in the French quota to 1,600 tons will further hamper the operations of the one remaining tuna cannery in Abidjan. This plant, however, had in December commenced sardine canning in a modest way, which should tend to stabilize their operation. The Ivory Coast is also developing plans for a greatly expanded tuna operation, including the construction of a 3,000-ton storage-capacity freezer plant, the establishment of a fleet of Ivorian tuna clippers, the construction of a modern tuna cannery designed to produce canned tuna competitive on the world market, a can-making factory, and a byproducts operation. (Regional Fisheries Attache, United States Embassy, Abidjan, December 7, 1965.)



East Germany

"ATLANTIK"-CLASS FREEZER TRAWLERS BEING BUILT FOR U.S.S.R.:

The 270-foot stern-trawler Atlantik is the latest model factory freezer trawler being built for the Soviet Union by East Germany. An East German shipyard in Stralsund is reported to have contracted to deliver 103 trawlers of the Atlantik-class to the U.S.S.R. by 1970. Previously, East Germany built a number of 262-foot Tropic-class trawlers for the Soviets. Like the Tropiks, the Atlantiks will have air-conditioning and other equipment for sailing in tropical climates. The Atlantik-class vessels, however, are somewhat larger with greater processing, freezing, and storage capacity. The shipyard building the Atlantik series described the vessel as follows:

The Atlantik is a 2-decker vessel. The rear sector of the main deck has been de-

signed as the fishing deck. Below the fishing deck are processing rooms. The engineroom and refrigeration machinery are midships at a lower level. Three storage holds (2 forward and 1 aft) have a combined capacity of 1,075 cubic meters (37,963 cubic feet). The vessel also has a fish meal storage room with a capacity of 163 cubic meters (5,756 cubic feet) and fish oil bunkers with a capacity of 11 cubic meters (388 cubic feet).

The trawl catch of the vessel is passed from the fishing deck through 4 hydraulically-operated hatches into 4 prefreezing bunkers at the rear of the processing rooms.

The prefreezing bunkers have the daily capacity to chill 48 tons of fresh fish to 2° C. (35.6° F.). Each of the bunkers is provided with a bucket elevator to convey chilled fish to workrooms. From the bucket elevator, fish are dropped through a chute upon a sorting belt where they are sorted for size before freezing in blocks or individually on 2 belt-type freezers with a combined freezing capacity of 45 tons in 22 hours. Frozen fish are stored at a temperature of -25° C. (-13° F.).

The fish meal and oil reduction unit uses a wet process which can handle 35 tons of raw fish or fish offal in 24 hours.

The Atlantik is designed to sail independently for 60 days with a crew of 80. Fresh water is supplied by a desalinization plant. The vessel is equipped with 2-engine diesel propulsion, variable-pitch propeller, automatic control of fishing gear from the bridge, echo-sounding equipment (horizontal and vertical), and radar. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, November 18, 1965, and other sources.)

Note: See Commercial Fisheries Review, June 1965 p. 81, and Nov. 1964 Supplement p. 9.



Greenland

SALMON FISHERY TRENDS, JANUARY-NOVEMBER 1965:

Inshore: The rise of the inshore Greenland salmon catch from about 55 metric tons in 1960 to 1,400 tons in 1964 has stirred considerable interest. However, in January-November 1965, the Greenland salmon catch a-

Greenland (Contd.):

mounted to only about 640 tons as compared with 1,300 tons in the same period of 1964. Fishing in December was expected to add little to the 1965 inshore catch. The drop in the 1965 catch to about half that in 1964 was due in large part to a diversion of fishing effort to the cod fishery.

Offshore: A Faroese vessel and a Norwegian vessel fished offshore from Greenland with gill nets in 1965. The catch of the Faroese vessel was estimated to be 40 tons by the end of November 1965, at which time the vessel was still fishing. The Norwegian vessel was reported to have returned home with a catch of 12 tons. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, December 9, 1965, and other sources.)

Note: See *Commercial Fisheries Review*, Jan. 1966 p. 75, and Nov. 1965 p. 58.



Iceland

EXPORT STOCKS OF PRINCIPAL FISHERY PRODUCTS, OCTOBER 31, 1965:

As of October 31, 1965, Iceland's stocks of frozen groundfish (fillets) for export to the United States totaled 2,624 metric tons, a decline of 1,505 tons from the stocks on hand September 30, 1965. (United States Embassy, Reykjavik, November 29, 1965.)

Icelandic Export Stocks 1/of Principal Fishery Products, October 31, 1965			
Item	Qty.	Value	
	Metric Tons	Million Kr.	US\$ 1,000
Groundfish, frozen: for export to:			
U. S.	2,624	69.8	1,621.0
other countries ...	4,862	92.4	2,145.8
Stockfish	1,800	55.8	1,295.9
Herring, frozen	1,710	9.7	225.3
Industrial products:			
fish meal:			
herring	27,954	234.8	5,452.9
other fish	2,089	15.4	357.6
herring oil	38,674	305.5	7,094.7
1/Includes only stocks intended for export. Note: Icelandic kronur 43.06 equal US\$1.00.			

1/Includes only stocks intended for export.
Note: Icelandic kronur 43.06 equal US\$1.00.

United States imports of frozen groundfish fillets from Iceland in the year 1964 totaled 17,812 metric tons of groundfish blocks and slabs, 4,669 metric tons of cod fillets, 2,791

metric tons of haddock fillets, and 548 metric tons of ocean perch fillets.

HERRING LANDINGS AND EXPORT TRENDS, LATE 1965:

By mid-November 1965 Iceland's herring catch surpassed the record 1964 herring catch of 553,036 metric tons, according to the Fisheries Association of Iceland. Export prices for herring products in 1965 were generally higher than in 1964. In 1964, herring products accounted for 35 percent of the value of all Icelandic exports.

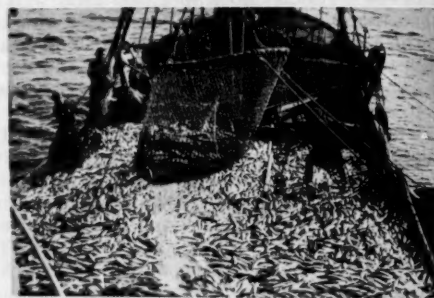


Fig. 1 - Icelandic fishing vessel brailing herring.

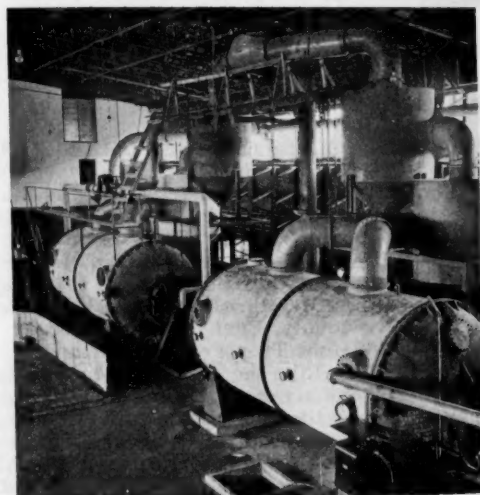


Fig. 2 - Type of evaporators used to dehydrate whole fish under vacuum in an Icelandic herring meal plant.

In January-October 1965, the total Icelandic herring catch was 546,552 metric tons as

Iceland (Contd.):

compared to 543,089 metric tons during the same 1964 period. During the first 10 months of 1965, 473,381 metric tons of that herring catch went into reduction (meal and oil), an 11.4-percent increase over the same 1964 period; and 57,096 tons went for salting, a 7.1-percent increase over January-October 1964. But herring for freezing in January-October 1965 was only one-quarter of that in the 1964 period, a drop from 65,029 tons to 16,075 tons.

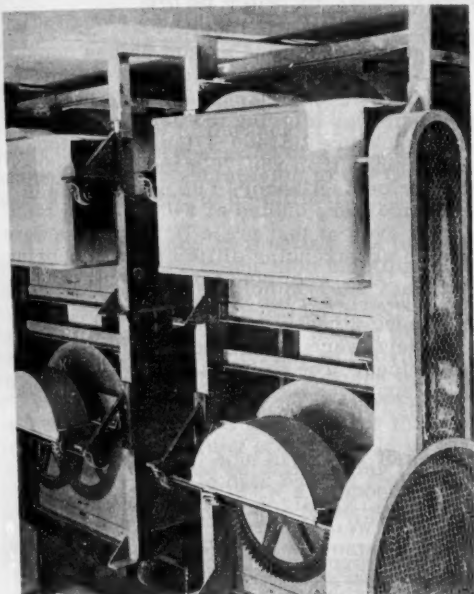


Fig. 3 - Cookers in an Icelandic herring fish meal plant.

A comparison of prices for Icelandic herring products available for export at the end of September 1965 with average 1964 export prices shows herring meal prices up 17 percent, herring oil up 4 percent, salted herring down 6 percent, and frozen herring down 3 percent. (United States Embassy, Reykjavik, November 17, 1965.)



Japan

FROZEN TUNA EXPORTS TO U. S. AND PUERTO RICO, OCTOBER 1965:

Japan's exports of frozen tuna to the United States and Puerto Rico in October 1965 were up 21 percent in quantity and 19 percent in value as compared with those in the previous month.

Exports to the United States were 9 percent more than in September and the value was up 17 percent.

Japan's Exports of Frozen Tuna by Species to the United States and Puerto Rico, October 1965 with Comparisons

Species	October		September	
	Quantity	Value	Quantity	Value
	Short Tons	US\$ 1,000	Short Tons	US\$ 1,000
Albacore:				
United States	2,593	906	2,387	798
Puerto Rico	2,734	893	1,688	501
Total	5,327	1,799	4,075	1,299
Yellowfin:				
United States	1,586	566	1,460	462
Puerto Rico	751	217	712	400
Total	2,337	783	2,172	862
Big-eyed:				
United States	9	1	2	1
Puerto Rico	34	8	100	19
Total	43	9	102	20
Total United States	4,188	1,473	3,849	1,261
Total Puerto Rico	3,519	1,118	2,500	920
Grand total	7,707	2,591	6,349	2,181

Source: Japan's Bureau of Customs.

Exports to Puerto Rico in October increased 41 percent from the previous month and the value was up 22 percent. Most of the increase in October shipments to Puerto Rico was in albacore tuna—up 62 percent in quantity and 78 percent in value. There was also some increase in yellowfin shipments to Puerto Rico but exports of big-eyed tuna were down to about one-third the quantity shipped in September. (Fisheries Attache, United States Embassy, Tokyo, December 10, 1965.)

EXPORT VALIDATIONS OF FRESH AND FROZEN TUNA AND TUNA LOINS, APRIL-OCTOBER 1965:

Japan's export validations of frozen tuna and cooked frozen tuna loins to the United States and Canada in October 1965 were up 12.7 percent from the same month in 1964. Albacore and yellowfin tuna accounted for

Japan (Contd.):

82.2 percent of that month's export approvals to those countries. Included in the September 1965 shipments were 1,233 short tons to Japanese landing bases including American Samoa.

Japan's Export Validations of Fresh and Frozen Tuna and Tuna Loins by Country of Destination, April-October, 1965						
Item	To U. S. & Canada		To Other Countries		Total	
	Oct.	Apr.-Oct.	Oct.	Apr.-Oct.	Oct.	Apr.-Oct.
.. (Short Tons) (Metric Tons) ..						
Albacore, round	5,832	43,434	728	5,059	6,023	45,285
Yellowfin:						
Round	356	2,187	160	257	483	2,241
Gilled & gutted:						
20/100 lbs.	1,204	18,282	-	2,392	1,093	18,977
100 lbs. up	8	1,716	-	-	7	1,557
Dred, with tail	464	4,547	334	14,660	755	16,788
Fillets	-	3	6	10	6	12
Other	435	2,426	-	-	2,300	2,200
Total	2,467	29,161	500	17,319	4,544	43,773
Big-eyes:						
Dressed	53	316	188	5,589	235	5,886
Other	415	1,019	145	569	1,026	1,494
Total	468	1,335	333	6,168	1,262	7,380
Skipjack:						
Bluefin:	651	5,126	896	1,213	1,287	5,863
Dressed	-	-	15	2,600	15	2,600
Fillets	-	-	-	947	-	947
Other	15	15	-	-	14	14
Total	15	15	15	3,547	29	3,561
Loins:						
Albacore	589	2,132	-	9	535	1,944
Yellowfin	72	1,127	-	24	65	1,046
Total	661	3,259	-	33	600	2,990
Grand total 1965	10,094	82,330	2,272	34,139	13,745	106,832
Grand total 1964	8,950	82,989	3,875	31,733	11,994	107,020

For the 7 months April-October 1965, Japan's frozen tuna export validations for the United States and Canada (included 7,032 tons to Japanese landing bases) were down about 1 percent from the same 7 months of 1964. (Fisheries Attache, United States Embassy, Tokyo, December 3, 1965.)

TUNA MARKET TRENDS, DECEMBER 1965:

An unusual tuna market situation developed in Japan in December 1965. Normally at that time of the year, domestic tuna demand is very strong due to the oncoming January holiday season. However, due to the expected arrival in Japan of 60-70 tuna vessels from the western Pacific, Indian Ocean, and Atlantic Ocean tuna grounds in December, the ex-vessel price of tuna for the domestic trade dropped about 20 percent from December 1964 prices. The decline in prices is also attributed in part to a general business downturn in Japan, the slackening demand for fish for the sashimi (raw, thinly sliced fish) trade, and to poor sales of fish sausages.

On the other hand, the export frozen tuna market was very firm and prices showed an

upward trend since November 1965. The ex-vessel price of frozen round albacore rose from 140 yen a kilogram (US\$353 a short ton) in late November to about 145 yen a kilogram (\$365 a short ton) in December. Buy offers from the United States for albacore ranged upwards to \$425 a short ton c.i.f., for albacore loin \$825-835 a ton c.i.f., and for Atlantic albacore \$360-370 per ton f.o.b. Las Palmas. (Suisan Tsushin, December 6, 1965 and other sources.)

FROZEN TUNA EXPORT PRICE TRENDS, NOVEMBER 1965:

Japanese frozen tuna export prices continued to trend upwards in November 1965, according to several Japanese trade periodicals. Spain was offering for Japanese-caught Atlantic albacore US\$460-470 a metric ton, c.i.f., or more than \$60-70 a ton above September prices. Albacore transhipped to Puerto Rico were quoted at \$405 a short ton, c.i.f., but even at that price U. S. buyers were said to be experiencing difficulty in procuring supplies. U. S. west coast packers were offering \$395 a short ton c.i.f. for frozen albacore shipped directly from Japan, but Japanese traders were said to be holding firm for higher prices. The ex-vessel price of albacore in Japan was said to be holding steady at 140 yen per kilogram (\$353 a short ton).

Prices of yellowfin tuna for export to Italy advanced to a record high of \$455-460 per metric ton c.i.f. Big-eyed tuna for export to that country were quoted at \$375-380 a metric ton c.i.f. (Katsuo-Maguro Tsushin, November 26; Suisan Tsushin, November 24, 1965.)

GOVERNMENT AND TUNA INDUSTRY HOLD FIFTH MEETING:

The Japanese Government and tuna industry leaders, who have been holding a series of joint meetings, to seek ways and means of aiding the depressed tuna fishery, on November 29, 1965, held their fifth and possibly final discussion meeting. Purpose was to (1) assess the present state of the tuna resources and (2) to determine the direction toward which government policy must be shaped to assist industry. With regard to resource assessment, the Government and industry leaders were divided in their views, the Government maintaining that, on the basis of data compiled by the Nankai Regional Fisheries (tuna) Re-

Japan (Contd.):

search Laboratory, the resources have not declined to the level affecting reproduction, whereas industry claimed reproduction has been affected. Concerning the direction in which Government policies should be developed to assist the tuna fishery, Government and industry views were likewise split, with the Government asserting the present fishing effort should be maintained, while the industry argued that effort should be reduced through fleet reduction.

There was no significant division of opinions concerning other problems affecting the fishery, such as management, marketing, and labor problems. A final meeting to draft recommendations was scheduled for January 1966, but in view of the lack of agreement on key issues the preparation of a unified recommendation for submission to the Government was expected to be difficult.

At the November 29 meeting, the proposal made at an earlier discussion meeting by the Japan National Federation of Tuna Fishermen's Cooperatives (NIKKATSUREN)--i.e., to establish a corporation to handle problems related to fleet reduction and to provide financial assistance to vessel owners in difficulty--was not discussed. The Government's expression of views at that meeting that the present level of fishing effort should be maintained is interpreted as diminishing the likelihood that NIKKATSUREN's proposal will be adopted. (Suisancho Nippo, November 30, 1965.)

Note: See Commercial Fisheries Review, January 1966 p. 79; December 1965 p. 62; October 1965 p. 80; September 1965 p. 66; July 1965 p. 71.

CANNED TUNA PACK, 1964:

Japanese canned tuna production in 1964 totaled 2,769,798 cases (48 1-pound cans), consisting of 1,134,388 cases of tuna in brine, 875,947 cases of tuna in oil, and 759,463 cases of other tuna products. In the tuna in brine pack, white meat accounted for 914,051 cases (907,664 cases solid pack and 6,387 cases flake pack) while lightmeat accounted for 220,337 cases (219,216 cases solid pack and 1,121 cases flake pack); the tuna in oil pack consisted of white meat 224,666 cases (190,636 cases solid pack and 34,030 cases flake pack) and light meat 651,281 cases (612,653 cases solid pack and 38,628 cases

flake pack). The 759,463 cases of "other tuna products" included 210,783 cases of flavored solid tuna, 353,306 cases of flavored flake tuna, 37,633 cases of jelly tuna, and 157,741 cases of other types of pack. The canned tuna in brine, both white meat and light meat, was packed principally in 7-oz. cans (48 to the case), with substantial amounts in 13-oz. cans (24 to the case), and 4-lb. cans (6 to the case). The canned tuna in oil was packed principally in 7-oz. cans. (48 to the case). (Kanzume Jiho, Vol. 44, No. 9, September 1965.)

FIRM TO MARKET CHUNK-STYLE CANNED TUNA IN OIL IN JAPAN:

Beginning in February 1966, a Japanese firm plans to market canned tuna in oil (chunk style) packed in 7-oz. cans for the domestic market. The firm has designed an attractive label for the pack aimed at creating the image of a high-quality canned food. The pack is expected to be retailed for about 110 yen (US\$0.355) a can. (Suisan Keizai Shimbum, November 18, 1965.)

TUNA PACKERS AND EXPORTERS FAIL TO NEGOTIATE NEW EXPORT AGREEMENT FOR CANNED TUNA IN BRINE:

Japanese tuna packers and exporters again towards the end of 1965 (as in 1964) failed to resolve their differences in renegotiating a new "Exporters Agreement" for canned tuna in brine. Prior to the termination of the old agreement, which expired November 30, 1965, the Ministry of International Trade and Industry (MITI) was reported as having proposed extending that existing agreement temporarily for three months (Note: The exporters wanted a four months extension) to February 28, with the export quota for that period set at 800,000 cases. The packers rejected the proposal since, like the exporters' proposal, it called for allocating the export quota on the basis of a 70-percent merit (actual performance) quota and 30-percent adjustment quota. The packers were reported seeking a change in the allocation system based on a merit quota of 40 percent and adjustment quota of 60 percent.

Following the failure of the exporters and packers to resolve their differences, MITI then announced that sales contracts concluded after December 1 to export canned tuna in

Japan (Contd.):

brine to the United States would not be validated for export. On December 2 the packers and exporters met again for the second time but failed to negotiate a new agreement. At that meeting, in response to a joint letter calling for a settlement of their differences by December 15 (signed by the chief of the Agricultural and Aquatic Products Section, MITI, and the chief of the Marine Products Section, Fisheries Agency, Ministry of Agriculture and Forestry), the packers and exporters drafted a joint reply to the effect that they opposed MITI's action but would defer the responsibility of drafting an interim agreement (to extend for one month) to the two government agencies. (Suisan Tsushin, December 3 & 4; Katsuo-Maguro Tsushin, November 26, 1965, and other sources.)

TUNA FEDERATION LAUNCHES PROMOTION ON CANNED ALBACORE TUNA IN OIL:

The Japan Federation of Tuna Fishermen's Cooperative Associations (NIKKATSUREN), which has been developing plans to promote domestic demand of canned albacore tuna in oil in an effort to stabilize albacore export prices, launched its first promotion in Tokyo on November 6, 1965. Under joint sponsorship with the Japan Canned Foods Association, NIKKATSUREN held a "tuna party" at the Nissei Theater in Tokyo, inviting 144 guests, including home economists from women's colleges, women's magazine editors, food editors for newspapers, and wives of the Minister of Agriculture and Forestry, and Diet representatives concerned with fisheries. A movie was shown and during the intermission over 10 varieties of foods prepared from canned albacore in oil were served to the guests. Through similar food sampling parties, NIKKATSUREN hopes to better acquaint consumers with canned albacore in oil which it plans to market beginning in March 1966 under its own label bearing the JAS (Japan Agricultural Standard) mark. NIKKATSUREN hopes to pack in the first year the equivalent of 150,000 cases (48 no. $\frac{1}{2}$ 7-oz. cans) of solid, which is 3 to 4 times the quantity now being produced in Japan for domestic consumption.

The November 6 "tuna party" is part of a gigantic three-year promotional program NIKKATSUREN plans to launch at a total cost of about 100 million yen (US\$278,000). Funds

for the promotion will be raised mainly by assessing Federation members. (Katsuo-Maguro Tsushin, November 10; Suisan Keizai Shimbun, November 2, 1965.)

SKIPJACK TUNA POLE-AND-LINE FISHING IN EASTERN ATLANTIC REPORTED EXCELLENT:

The six Japanese pole-and-line vessels (one 350-ton and five 240-ton) in the eastern Atlantic in November 1965 had excellent skipjack tuna fishing. Some vessels made as many as three trips a month. The six vessels will most certainly be able to put in an average of 18 trips a year. A minimum of 12 trips per vessel per year is calculated to be necessary for the vessels to show a profit.

The skipjack, which are being landed at Tema, Ghana, and at Freetown, Sierra Leone, sold ex-vessel for US\$140 a short ton for large fish and \$110 a ton for small skipjack. At Tema large quantities of the small skipjack were being marketed locally. (Suisan Tsushin, November 26, 1965.)

LARGE NUMBER OF ATLANTIC TUNA VESSELS RETURN:

Japanese tuna vessels engaged in the Atlantic fishery had returned to Japan in large numbers by early November 1965. They shifted their operations to the Pacific and Indian Oceans. The Japanese Atlantic fleet, which at the height of the fishery numbered about 140 vessels, was down to about 80 vessels, with indications that it may decline to 50 vessels by spring 1966. High prices paid for tuna landed in Japan influenced Atlantic tuna operators to shift their operations to Japan.

The rise in tuna prices in Japan is attributed to the steadily increasing demand for frozen tuna as sashimi (sliced fish served raw), the demand for which peaks in January for the holiday trade, and to the supply shortage arising from the declining catch. According to a survey made by one Japanese fishing company, yellowfin tuna landed in Japan in November 1965 sold at an average of 180 yen a kilogram (US\$454 a short ton), up 20 percent from spring, and albacore (primarily canned or exported in the round to the United States) 138-140 yen a kilogram (US\$348-353 a short ton) up 22-23 percent. (Suisan Kei-

Japan (Contd.):

zai Shimbun, November 11, 1965, and other sources.)

TUNA BAIT PRODUCTION TRENDS:

As a result of the poor saury season in 1964, Japanese tuna long-line fishermen were faced with a critical shortage of bait saury in 1965 and had to pay as much as 12 yen (US\$0.033) a fish. In anticipation of another poor saury season in 1965 (in progress the latter part of the year), the large tuna vessel operators systematically began to purchase medium and large saury for bait as soon as the season commenced in the fall. Total Japanese production of bait saury, as of October 30, was 29,200 metric tons, with an additional 8,000 tons expected to be processed by November 18.

The annual demand of bait saury is estimated at 45,000 metric tons but since 1964 many fishermen were reported to have switched to other bait fish, such as sardines, squid, and mackerel because of the high price of bait saury. In November 1965, a box containing 120-130 large bait saury was selling at the landing ports for 650-700 yen (US\$1.80-1.94), with 140-150 count fish selling for about 570 yen (\$1.58). Cost to the fishermen is estimated to be 8-9 yen (\$0.022-0.025) a fish, which is much less than what they paid a year earlier. Some saury were sold to South Korean and Formosan tuna fishermen for \$3.20 a box for 140-150 count fish, delivery American Samoa. (Suisan Tsushin, November 26, 1965.)

PURSE SEINER TO TEST FISH FOR TUNA IN CAROLINE ISLANDS WATERS:

The 212-ton Japanese purse seiner Taikei Maru (equipped with two power blocks) was scheduled to depart Japan on November 25, 1965, to explore the tuna fishing grounds off the Caroline Islands. The vessel will make a total of five trips up to April 15, 1966, and operate in two areas: (1) the area bounded by the equator and latitude 10° N. between longitudes 130° E. and 140° E.; and (2) the Coral Sea grounds east and southeast of New Guinea between longitudes 140° E. and 160° E. Each trip is expected to take 26 days (16 days running, 7 days fishing, and 3 days unloading and taking on supplies). From April

25 to May 30 the vessel will make two trips to the tuna grounds bounded by: (1) latitudes 10° N. and 20° N. between longitudes 140° E. and 150° E. and (2) latitudes 20° N. and 30° N. between longitudes 125° E. and 130° E., but excluding the waters to the west of Nansei (Ryukyu Islands). (Suisan Keizai Shimbun, Nov. 19, 1965.)

NEW TUNA TROLLING GEAR DEVELOPED:

A new trolling gear has been developed in Japan to help the tuna fishing industry overcome the problem of declining catch. Devised by Dr. Hamuro of the Fishing Boat Research Division of the Japanese Fisheries Agency, the new gear employs a submersible device housing a telemeter and a "fish head trapper," which is attached to the troll line near the artificial lure. In operation, first the tuna school is located by means of a fish-finder and the depth of the school determined. The telemeter in the submersible unit transmits signals to the vessel, which are plotted on the fish-finder chart. Using this information, the depth of the new gear is adjusted to the depth of the fish school by means of a hydraulic or electrically-powered winch. When the fish strikes the lure, the tension on the line releases from the submersible device the "fish head trapper" (consisting of six wire claws), which slides down the leader and "grabs" (slides over) the head of the fish, thereby preventing its escape. As the "fish head trapper" is released from the submersible device, this action simultaneously reverses the angle of the wing-shaped flaps of the unit, propelling the device upwards to the surface. The troll line is then reeled in by means of a winch and the fish retrieved.

The trolling gear consists of: (1) main line, to which are attached the submersible echo-sounder and "head trapper," leader and lure; (2) power equipment, including a hydraulic winch; (3) information-relaying devices, such as fish-finder and telemeter; and (4) other mechanical devices, such as a line-tension meter. About eight lines can be fished at one time by a 300-ton tuna vessel.

The advantages of the new gear are said to be the selectivity of depth ranges beyond the presently fished 200 meters (656 feet), wider selectivity of fishing grounds, improved freshness of fish since they can be landed immediately upon capture, elimination of shark damages, reduction in gear loss, substantial

Japan (Contd.):

savings in operating costs through the use of artificial lures (which eliminates the need for fish bait, such as saury and squid); and reduction in manpower.

Initial gear tests conducted off Kurihama (south of Tokyo Bay) and in the South Pacific off the Samoan Islands were not completely satisfactory (partly due to the scarcity of fish and to the lateness of the season), but refinement is expected to contribute greatly to the exploitation of mid-water tuna and other species of fish. (Suisan Keizai Shimbun, November 26, 1965.)

TUNA FISHING COMPANY TRIES TO CUT LABOR COSTS:

To combat rising costs and declining catch rates in the tuna fishing industry, a major Japanese company is trying to (1) reduce the size of crews on its tuna vessels, and (2) reinstate the "share" system of paying crews according to results. That cost-cutting program was described in Nihon Kogyo, November 18, 1965, as follows:

A major Japanese company is studying the restoration of the "onaka sei" system of paying tuna fishing crews according to the value of their landed catch. The company recently applied that system to 20 of its tuna vessels based at Tokyo with good results.

Furthermore, the company is trying to reduce the size of crews on its tuna vessels. The company recently sent the Hatsuhi Maru (170 tons) to the South Seas with its crew reduced from 28 to 15 men. That reduction together with the "onaka sei" system of payment resulted in savings of 3 million yen (US\$8,333).

CRAB MEAT EXPORTS, OCTOBER 1965:

Japanese exports of canned crab meat in October 1965 amounted to 40,499 cases (48 $\frac{1}{2}$ -lb. cans) as compared with 66,308 cases during the previous month and 60,150 cases in October 1964. Of the total canned crab meat exports in October 1965, 12,404 cases were shipped to the United States, 8,775 cases to the United Kingdom, 825 cases to Canada, and 18,495 cases to other unspecified countries.

In October 1965, king crab meat exports amounted to 29,149 cases or 72 percent of total canned crab meat exported. Of the total king crab exported in that month, 10,390 cases went to the United States, 6,525 cases to the United Kingdom, and 12,234 cases to other countries.

The October 1965 Japanese canned crab meat exports also included: Kegani crab--6,953 cases, of which 1,614 cases went to the United States; Zuwai crab--4,297 cases, of which only 400 cases went to the United States; 100 cases of Hanasaki crab were shipped to unspecified countries. (Fisheries Attache, United States Embassy, Tokyo, November 30, 1965.)

EXPORTS OF CANNED KING CRAB TO U. S. DECLINE:

Japan has contracted to sell to foreign countries a total of 210,000 cases (48 $\frac{1}{2}$ -lb. cans) of king crab from her 1965 pack. Sales to the United States, which in previous years consumed over half of Japan's king crab exports, have dropped and the United States as of November 1965 ranked second as the principal buyer of Japanese crab meat. France led in the importation of Japanese king crab with 65,000 cases, followed by the United States with 58,000 cases, and Great Britain with 56,000 cases. (Suisan Tsushin, November 13, 1965.)

CANNED SHRIMP EXPORTS, OCTOBER 1965:

Japan's exports of canned shrimp (24 $\frac{1}{2}$ -lb. cans) during October 1965 were more than double those of the previous month but were down 62 percent from the October 1964 exports.

Compared to the previous month, the biggest increase was in shipments to the United

Japan's Exports of Canned Shrimp by Country of Destination, October 1965 and Comparisons

Country of Destination	1965		1964	
	Oct.	Sept.	Oct.	Sept.
... (Cases of 24 $\frac{1}{2}$ -Lb. Cans) ...				
United States	6,900	3,000	17,700	16,275
United Kingdom . . .	18,387	3,000	44,009	37,100
Canada	2,000	5,900	8,500	6,836
Other	4,730	2,900	13,800	5,358
Total	32,017	14,800	84,009	65,569

Japan (Contd.):

Kingdom; exports to the United States were up also; but shipments to Canada were down 66 percent. (Fisheries Attache, United States Embassy, Tokyo, November 30, 1965.)

**FROZEN SWORDFISH EXPORT
VALIDATIONS TO THE U.S. AND
CANADA, APRIL-OCTOBER 1965:**

Japanese export validations of frozen broadbill swordfish (mostly fillets and chunks) to the United States and Canada in October 1965 totaled 466 short tons valued at US\$382,966. This compared with approvals of 591 tons valued at \$479,857 in the previous month and 369 tons valued at \$236,084 in October 1964.

For the 7 months April-October 1965, Japan's export validations of frozen swordfish to the same countries totaled 2,751 tons valued at \$2.1 million. Fillets of that species accounted for 64 percent of the total, with the remainder consisting of chunks and swordfish processed in other forms. For the same 7 months in 1964, the frozen swordfish export approvals totaled 2,092 tons valued at \$1.3 million. (Fisheries Attache, United States Embassy, Tokyo, December 3, 1965.)

**EXPORTS OF FROZEN RAINBOW
TROUT, OCTOBER 1965:**

Japan's exports of frozen rainbow trout in October 1965 were down slightly as compared with the previous month--dropped 6 percent in quantity but increased 4 percent in value. The United States continued as the principal buyer of Japanese frozen rainbow

trout, accounting for 73 percent both in quantity and value of the total October 1965 exports.

October shipments to the United Kingdom were down to about half those of the previous month. (Fisheries Attache, United States Embassy, Tokyo, December 10, 1965.)

**EXPORTS OF MARINE
PRODUCTS, JULY 1965:**

Japan's exports of marine products in July 1965 included considerably more canned fish

Japan's Exports of Marine Products, July 1965

Product	Quantity	Value
	Metric Tons	US\$ 1,000
Fresh & frozen:		
Tuna, skipjack	519	67
Tuna, other	18,044	5,742
Marlin	530	386
Sea bream	2,165	322
Mackerel	395	61
Saury	184	61
Salmon	16	25
Other fish	1,905	633
Total fresh & frozen	23,758	7,297
Whale meat	1,985	458
Frog legs	111	178
Cured:		
Cod	6	6
Boiled and dried	36	17
Shark fins	77	133
Other	6	2
Total cured	125	158
Shellfish, etc.:		
Scallops	3	28
Oysters	9	8
Shrimp	107	236
Squid	679	181
Octopus (fresh)	87	39
Other	161	72
Total shellfish, etc.	1,046	564
Canned:		
Salmon	7,610	14,081
Tuna, skipjack	458	347
Tuna, other	3,198	2,950
Mackerel	2,435	844
Saury	416	203
Sardine	127	53
Horse mackerel	1,428	489
Other fish	1,641	1,133
Crabs	602	1,753
Shrimp	272	653
Squid	174	67
Other shellfish	724	683
Total canned	19,085	23,256
Other products:		
Seaweed:		
Kombu	45	31
Laver 1/	121	8
Agar agar	86	311
Whale oil (baleen)	60	333
1/In 1,000 sheets.		

Japan's Exports of Frozen Rainbow Trout by
Country of Destination, October 1965

Destination by Country	October		September	
	Qty.	Value	Qty.	Value
	Short Tons	US\$	Short Tons	US\$
United States	157	125,869	131	97,869
United Kingdom	19	13,058	41	25,500
Belgium	4	3,336	11	7,903
Canada	18	15,531	26	19,447
Netherlands	15	12,997	12	9,583
West Germany	1	792	-	-
Australia	-	-	2	1,689
Sweden	1	469	6	3,828
Other	1	462	-	-
Total	216	172,514	229	165,819

Source: Japan's Bureau of Customs.

Japan (Contd.):

than was exported in the previous month, and there was some increase in shipments of fresh and frozen fishery products. Salmon accounted for much of the increase in the canned fishery products group, followed by larger exports in July of canned mackerel, crab, and shrimp.

The July 1965 exports of fresh and frozen fishery products were up 18 percent in quantity and 11 percent in value from the previous month. As compared with the previous month, exports of fresh and frozen tuna in July were up 11 percent in quantity and 12 percent in value. (Fisheries Attache, United States Embassy, Tokyo, November 18, 1965.)

FIRM TO IMPORT SHRIMP FROM THAILAND:

A Japanese whaling firm plans to import about 500 metric tons of frozen shrimp a year from a Thailand processor. Japanese wholesale prices for imported shrimp are said to be between ¥500,000 and ¥700,000 (US\$1,389 to \$1,944) a metric ton or about 63 to 88 cents a pound. The Japanese firm may also buy shrimp in Thailand for re-export to other countries. The Japanese firm plans to give technical and managerial assistance to its Thailand associate. (*Nihon Kogyo*, December 7, 1965.)

FISHERY LANDINGS IN SELECTED AREAS, JUNE 1965:

Japan's landings of fish and shellfish at 248 fishing districts and 5 major cities during June 1965 totaled 337,800 metric tons, a decrease of about 8 percent below May 1965 landings, but an increase of 15.6 percent above the landings in June 1964. Compared with the previous month, the most significant decreases in the June 1965 landings were in jack mackerel and scad, mackerel, and Alaska pollock.

Landings of the major species in June 1965 were as follows (June 1964 data in parentheses): tuna 50,700 tons (61,200 tons); jack mackerel-scad 49,100 tons (39,600 tons); mackerel 50,200 tons (37,400 tons); common squid 15,600 tons (5,500 tons); flounder 15,000 tons (8,200 tons); and Alaska pollock 23,600

tons (36,000 tons). (Fisheries Attache, United States Embassy, Tokyo, December 14, 1965)

LANDINGS AND UTILIZATION OF FISHERY AND OTHER MARINE PRODUCTS, APRIL 1965:

Japan's landings of fishery and other marine products at 248 major landing points in April 1965 totaled 267,593 metric tons, down about 10 percent from the previous month's landings. Fresh fish accounted for 90 percent of the total landings, with the remainder mostly frozen fish. As compared with the previous month, landings were down for mackerel and mackerel-like species, Alaska pollock, and anchovies, but increased for tuna and several flatfish species.



Fig. 1 - A large catch of yellowtail unloaded on the beach of a Japanese fishing village.



Fig. 2 - In Tokyo Bay, transferring bait from live box to fishing vessel in background.

Included in the April 1965 landings were (in metric tons): fresh and frozen tuna (in-

Japan (Contd.):

cluding skipjack) 32,216, mackerel 40,099, horse mackerel 31,250, Alaska pollock 37,902, flounder and other flatfish 10,889, and swordfish 5,418.

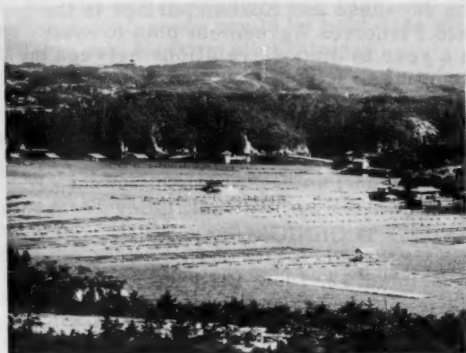


Fig. 3 - Pearl oyster rafts in Kaskiojima Ago Bay, Japan.

Of the total April 1965 landings, 134,421 tons were used fresh and 16,699 tons were frozen. About 70,000 tons were processed as edible fishery products and byproducts--8,542 tons were for canning, and about 2,000 tons manufactured as oil, feed, and fertilizer products, with the remainder processed in other forms. (Fisheries Attache, United States Embassy, Tokyo, November 12, 1965.)

JAPANESE VIEWS ON FISHERIES AGREEMENT WITH SOUTH KOREA:

Under the Fisheries Agreement concluded in June 1965 between the Governments of Japan and the Republic of Korea (ROK), Japan agreed to provide substantial economic aid to South Korean fisheries. The agreement also called for Japan to recognize Korean coastal fishery limits of 12 nautical miles and provided a conservation area in the Korean Strait in which fishing will be jointly restricted. Final ratification was also expected to expand Korean fishery exports to Japan.

The Fisheries Agreement is part of an effort to normalize relations between the two countries. In December 1965, the Governments of the two countries were negotiating ways to carry out the agreement. At the same time, a private agreement concerning safe fishing conditions was being negotiated

by the Greater Japan Fisheries Association and the ROK Central Council of Fisheries Unions.

Japanese financial assistance to Korea will include a \$90-million fisheries aid fund set up under the normalization agreement, plus reparations owed to the ROK, and private loans. Korea plans to use the funds for large-scale fishing fleet expansion. Guidelines for aiding Korean fisheries while at the same time protecting Japanese interests were set forth by the Japanese Fisheries Agency, November 9, 1965, as follows:

(1) With regard to the improvement of Korean fishing ports and public distribution facilities, Japan will comply with the ROK requests as far as possible. Japan will also contribute toward a general buildup of ROK fisheries and also toward increasing the income of ROK fishermen.

(2) Japan will offer necessary commodities and services for the modernization of Korean coastal fisheries, coastal fishing vessel equipment, and even for the promotion of fish farming. However, the culture of pearls will not be regarded as an object of cooperation.

(3) The number of Japanese trawlers and purse-seine vessels which can be exported to Korea will partly depend on the size of Korean fleets in the common restricted areas, and also on the state of fishery resources in fishing grounds outside the restricted areas.

(4) The number of bonito and tuna fishing vessels which will be exported will be fixed so as not to affect Japanese fishing for bonito and tuna.

(5) Neither vessels for fishing for salmon, salmon-trout, and crab in the northern seas, nor whaling vessels will be exported, partly because measures for preserving those resources are being taken under international fisheries treaties.

Reaction of the Japanese fishing industry to the agreement has been mixed. Some of the large Japanese fishing companies are interested in joint ventures with Korean groups. On the other hand, Japanese fishermen are concerned about restrictions on their fishing grounds and the effect of increased fishery shipments from Korea.

Japan is reported to be planning to reduce the size of its fishing fleet off the eastern coast of the Korean Peninsula from about 3,000 to 1,700 vessels. Most of those involved are small coastal vessels which can't be easily converted to other fisheries.

The recognition of a 12-mile Korean fisheries limit is also causing concern. It is felt that it may serve as a precedent that will encourage other countries to expand their limits, thereby further limiting Japanese fishermen.

Japan (Contd.):

Japanese concern over expanded Korean fishery shipments grows out of the desire to protect domestic markets. Marine products exports to Japan valued at US\$63 million in 1967 is the goal of the ROK. That would be a threefold increase over 1964. The ROK side is asking Japan for liberalization of import restrictions on cheaper fish such as saury, mackerel, and sardines.

It appears that the Japanese-Korean Fisheries Agreement may result in considerable readjustment for both countries. (*Sankei*, November 10, 1965, *Yomiuri*, November 18, 1965, and other sources.)

Japanese-ROK Private Fisheries Agreement: On December 17, 1965, a Japan-ROK Private Fisheries Agreement was signed in Seoul. The parties to the Agreement are the Greater Japan Fisheries Association and the ROK Central Council of Fisheries Unions. The Agreement was reported to follow the general outline agreed upon during preliminary negotiations in Tokyo, December 1, 1965. Following are the major points outlined in the preliminary negotiations:

1. Aims of the Agreement shall be clearly stated as (1) realization of safe fishing operations by vessels of the two nations and (2) mediation for compensation for damage caused by accidents. Supplementary documents shall have stipulations concerning maintenance of order on fishing grounds.
2. The following eight items shall be the basic items of the Agreement: sea areas to which the Agreement is applicable, marks, matters to be observed in conducting fishing operations, matters concerning sailing for shelter, matters concerning anchorage and drifting, salvage, and the term of validity of the Agreement.
3. Stipulations for marks shall be established according to day and night and types of fisheries, except for those stipulated in the Government-To-Government Agreement and the International Marine Clash Prevention Rules. As for matters to be observed in conducting fishing operations, operating intervals shall be fixed according to types of fisheries.
4. Regarding the handling of accidents, an "Accident Disposition Committee" (tentative name), to be composed of private organizations of the two countries, shall be established. The Committee shall have consultations every 2 or 3 months.
5. The term of validity of the Agreement shall follow that of the Government-To-Government Agreement.

The concluding negotiations in Seoul were concerned mainly with the handling of accidents and damage compensation. It was agreed that accidents should be settled mutual-

ly, if possible, through negotiations between the vessels involved. Private organizations of the two countries will assume responsibility for adjusting compensation when agreement can't be reached by the fishing vessels concerned.

The Japanese and Korean parties to the Private Fisheries Agreement plan to meet twice a year to discuss relations between the two countries. (*Nihon Keizai*, December 2 and 18, 1965.)

Note: See *Commercial Fisheries Review*, Dec. 1965 pp. 64 and 72; and Dec. 1964 p. 104.

PROPOSED TECHNICAL COOPERATION AGREEMENT WITH SOVIETS:

On October 12, 1965, the Japanese Fisheries Agency met with Japanese trade groups to explain a proposal for technical cooperation between Japanese and Soviet fisheries. The Soviet Fisheries Minister had recommended such cooperation when the Japanese Minister of Agriculture and Forestry visited Japan in May 1965. It was hoped that the proposal could be given formal recognition on the occasion of the Soviet Fisheries Minister's visit to Japan which is anticipated in the spring of 1966.

The proposal aims at scientific and technical cooperation (excluding salmon for which cooperative agreements have already been concluded) to improve Japanese and Soviet fisheries. Following are the main provisions of the Japanese Fisheries Agency draft of the 5-year "Japan-Soviet Fisheries Scientific, Technical Cooperation Plan" as published in *Nihon Keizai*, October 12, 1965:

Exchange of Information and Data: Would include (1) fishery statistics, (2) periodical publications, and (3) books.

Joint Surveys of Fish Resources: Would include (1) joint surveys of mackerel pike in which Japanese officials would board a Soviet vessel, (2) joint surveys of bottom fish (after the second year); and (3) joint surveys of tuna (after the fourth year).

Inspection and Study Activities, and Interchange of Specialists: Would include (1) inspection for surveying fishing implements and fishing methods (the first year); (2) inspection of study and development programs and sur-

Japan (Contd.):

vey vessels (the second year); (3) inspection of fishery hatcheries and breeding methods (the third year); and (4) inspection of the use of processed marine products (the fourth year).

Adjustments of Cooperation Plan: An adjustment conference would be held once a year in Tokyo and Moscow alternately.

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MAJOR FIRMS PLAN EXPANSION OF MINCED FISH OPERATION:

The major Japanese fishing firms operating factoryship fleets in the Bering Sea in November 1965 were planning to greatly expand their minced fish operations. A large fishing company dispatched the 11,581-ton factoryship Tenyo Maru (accompanied by 6 trawlers in the 270- to 370-ton class) to the Bering Sea around December 1, 1965. The fleet is scheduled to return to Japan in late March 1966. The fleet's production target is 4,500 metric tons of minced fish meat, 1,000 tons of frozen fish, 2,000 tons fish meal and 300 tons of fish oil. That firm is also contemplating using its 11,193-ton factoryship Soyo Maru for processing minced fish in 1966.

Another major Japanese firm is converting its 10,357-ton fish meal factoryship Gyokuei Maru to increase the factoryship's minced fish production capacity threefold, to 30 metric tons a day. However, Gyokuei Maru will continue to serve primarily as a fish-meal factoryship.

Two other large firms also have under study plans to engage in minced fish meat production in 1966. One firm is expected to engage in minced fish production on an experimental basis in 1966.

The interest of the major Japanese fishing firms to engage in or expand their minced fish operation (Note: Alaska pollock is the primary species used in minced fish production) is attributed to the increased demand in Japan for minced fish (used extensively as a fish sausage and cake ingredient), large resource of Alaska pollock available in the Bering Sea, excellent yield, and high prices paid for minced fish meat. It is reported that 100 metric tons of Alaska pollock yield as much as 25 tons of minced fish as compared to 16 tons of fish meal (Note: Alaska pollock are

also used extensively by Japan in the production of fish meal). Good quality minced fish meat fetches as much as 130,000 yen (US\$361) a metric ton as compared to 73,000 yen (US\$203) a ton for fish meal. Thus, it would be more profitable to process minced fish despite the somewhat high cost of processing that product. (Suisan Keizai Shimbun, November 15, 1965.)

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INDUSTRIAL PRODUCTS PRODUCTION, USE, AND FOREIGN TRADE, 1964-1965 AND FORECAST 1966:

Fish Meal: Japan is an importer of fish meal despite sizable domestic production. Forecasts call for 1966 (calendar year) Japanese fish meal production to equal the estimated 1965 output of 285,000 metric tons. Imports in 1966 are expected to continue at the 1965 level of 100,000 tons. Japanese imports of fish meal in January-July 1965 totaled 79,200 tons.

Table 1 - Japanese Fish Meal Supply Situation and Foreign Trade, Calendar Years 1964-1965 and Forecast 1966

Item	1/1966	2/1965	1964
	.. (1,000 Metric Tons) . . .		
Production	285.0	285.0	271.4
Imports:			
Year	100.0	100.0	102.3
January-July	-	79.2	68.5
Exports:			
Year	10.0	10.0	6.2
January-July	-	6.0	3.2
1/Forecast.			
2/Estimated.			

Marine Oil: In the past, the Japanese marine oil industry has satisfied domestic needs and yielded large quantities of whale oil and sperm oil for export. But forecasts indicate declining production will reduce export stocks in 1966.

The margarine and shortening industry is the main domestic user of edible marine oils. It will take 21,300 tons of whale and 26,200 tons of fish oil in fiscal year 1965 (April 1965-March 1966), according to estimates by the Japanese Ministry of Agriculture and Forestry. Other domestic food uses should account for an additional 1,300 tons of marine oil in fiscal 1965. The estimates indicate that for domestic nonfood uses in fiscal 1965 a total of 19,600 tons of sperm oil and 6,200 tons of fish oil will be consumed.

Whale and Sperm Oil: Japanese estimated 1965 (calendar year) whale oil produc-

Japan (Contd.):

Table 2 - Japanese Marine Oil Supply Situation and Foreign Trade, Calendar Years 1964-1965 and Forecast 1966			
Item	1/1966	2/1965	1964
 (1,000 Metric Tons) . . .		
Edible Marine Oil:			
Fish-Liver Oil:			
Production	8.0	8.0	8.9
Exports:			
Year	1.0	1.0	1.8
January-July	-	.5	1.0
Fish Oil:			
Production	19.0	19.0	18.1
Opening stocks	7.0	7.2	9.9
Whale Oil:			
Production	90.0	100.0	115.3
Opening stocks	4.0	3.7	5.9
Exports:			
Year	60.0	72.0	80.7
January-July	-	71.6	80.6
Inedible Marine Oil:			
Sperm Oil:			
Production	30.0	37.0	46.5
Opening stocks	2.0	2.2	7.3
Exports:			
Year	4.0	10.0	25.0
January-July	-	8.4	24.6
1/Forecast.			
2/Estimated.			

tion of 100,000 metric tons was down 13 percent from 1964. Sperm whale oil output in 1965 of 37,000 tons was down 20 percent. Further declines are forecast in 1966 because of Antarctic conservation measures.

Exports declined with the supply in 1965. Forecasts call for baleen whale oil exports to drop from 100,000 tons in 1965 to 90,000 tons in 1966. Sperm whale oil exports are expected to drop to a very low level in 1966 as the Japanese Antarctic fleet concentrates mainly on catching baleen whales.

Fish-Body Oil: Japanese production of fish oil in 1964 dropped 17 percent from the 24,000 metric tons produced in 1963. The estimated output in 1965 amounted to 19,000 tons, and 1966 production is expected to continue at the same level. Japanese foreign trade in fish-body oils is limited.

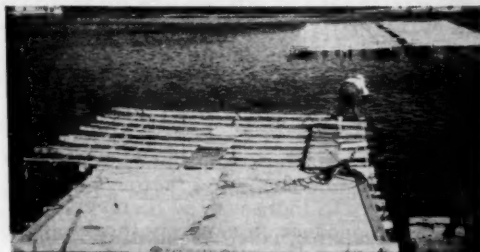
Fish-Liver Oil: Japanese production of fish-liver oil is estimated at 8,000 metric tons in 1965 and forecast at the same level in 1966. Exports of 1,000 metric tons are estimated for 1965 and forecast for 1966. (United States Embassy, Tokyo, October 8, 1965.)

Note: See *Commercial Fisheries Review*, Aug. 1965 p. 87; and July 1965 p. 77.

FISHERIES AGENCY TO ASK TIGHTER REGULATION OF CULTURED PEARL INDUSTRY:

In late 1965, the Japanese Fisheries Agency was preparing a "White Paper" on problems in Japan's valuable cultured pearl industry. That industry yielded export products valued at 20 billion yen (US\$55.6 million) in 1964. Now, however, overcrowding is creating problems in the industry. The Fisheries Agency "White Paper" will be mainly concerned with ways to (1) avoid overcrowding of culture beds and (2) improve quality control.

At the pearl beds of Ago Bay in Mie Prefecture (where about 40 percent of Japanese pearls are turned out) and in the Prefectures of Ehime and Oita, the abuses of congested culture have already become quite clear. Recently, only about 3.75 kilograms (8.3 pounds) of pearls were taken out of 10,000 mother-of-pearl at those beds, as against an average of about 5.6 kilograms (12.3 pounds) until several years ago.



Pearl oyster rafts in Kaskiojima Bay, Japan.

The major recommendations to be announced in the Japanese Fisheries Agency "White Paper" on pearls were reported in *Nihon Keizai*, October 19, 1965, as follows:

Problems and Recommendations: At present, local public entities in Japan are permitted to exercise jurisdiction over pearl fisheries as they like. For the overall coordination of administration over pearl fisheries, the central Government should intervene in this field of administration. It is necessary to establish a "maximum-limit formula" for the licensing of pearl culture, through such methods as (1) specifying the standard size for pearl beds, (2) establishing suitable conditions to be required for the starting of new enterprises, and (3) setting a proper scale for each

Japan (Contd.):

pearl fishery ground corresponding with productivity.

Many Japanese pearl fishery enterprises are short of funds and, consequently, hasten to raise products from small beds. It is necessary to give financial aid to those enterprises. An agency to stabilize the prices of pearls by such measures as coordination and stockpiling must be established in order to prevent a decline in prices due to overproduction in small beds. The present Japanese Pearl Fisheries Law must be revised mainly for the purpose of restricting the issuance of licenses to new pearl fishery enterprises.

COMPOSITION OF DISTANT WATER TUNA FLEET:

A total of 843 Japanese vessels were engaged in the distant-water long-line tuna fisheries as of January 1, 1965. Of that number, 669 vessels (194,797 gross tons) were long-liners and 50 were factory-type mother-ships (55,055 gross tons) carrying 124 portable-type fishing craft.

Most of the long-liners were vessels ranging from 180 to 500 gross tons; 5 were of 500 to 700 gross tons; and 2 were over 700 gross tons. The factory-type motherships ranged from 500 to 3,000 gross tons; 3 were of 3,000 gross tons and over. The 124 portable vessels totaled 2,242 gross tons. (Fisheries Attache, United States Embassy, Tokyo, November 17, 1965.)

TUNA FEDERATION CHARTERS OIL TANKER TO REFUEL VESSELS AT SEA:

The Japan National Federation of Tuna Fishermen's Cooperative Associations (NIK-KATSUREN) again chartered the 1,983-ton tanker Tofuku Maru to conduct high-seas refueling in the eastern Pacific Ocean. NIK-KATSUREN expected to assign a doctor to the tanker to provide medical services to the fishermen at sea.

The Tofuku Maru, which was scheduled to depart Japan November 11, 1965, expected to call at Maui Island, Hawaii, before proceeding to Balboa, Panama, to pick up additional fuel and supplies. On her first leg across the Pacific, the vessel was expected to refuel and provision a total of 30-40 fishing

vessels. (Katsuo-Maguro Tsushin, November 5 & 10, 1965.)

APPLICATIONS FOR DISTANT-WATER TRAWL FISHERY:

In July 1965, the Japanese Government approved the licensing of 22 trawlers over 500 gross tons to engage in the distant-water trawl fishery, which includes all ocean areas except the waters north of 10° N. latitude in the Pacific Ocean, north of 40° N. latitude in the Atlantic Ocean, the Mediterranean Sea, Gulf of Aden, and the Red Sea. Closing date for receiving license applications was set as October 5, 1965. As of October 12, the Central Office of the Fisheries Agency had received a total of 95 applications, but the figure was not final since the Agency had not yet heard from all the regions. However, the Agency was reported as not expecting to receive more than 100 applications. (Suisan Tsushin, November 13, 1965, and other sources.)

(Note: The first licensing of trawlers for the distant-water trawl fishery was announced in July 1963. At that time, the Japanese Government announced that it would approve the operation of a total of 48 "standard" (50- to 300-ton) trawlers, not including those vessels already operating in the fishery. The Government also established a conversion system, which allowed for the construction of larger trawlers on the basis of one large trawler for x number of "standard" vessels, and in November of that year approved the licensing of 18 trawlers, ranging in size from 300-3,500 tons, mainly for operation in the Atlantic Ocean. Available data as of the end of November 1965 indicated that there were about 45 large trawlers, mostly in the 1,500- to 3,000-ton class, operating in the Atlantic Ocean off West Africa and South Africa. The 22 trawlers over 500 tons to be newly licensed are also expected to operate mainly in the Atlantic Ocean.)

FIRM PURCHASES CARGO VESSEL FOR KING CRAB FACTORYSHIP:

A Japanese firm has purchased the 7,292-ton cargo vessel Kyowa Maru as a replacement for the 5,385-ton king crab factoryship Tokei Maru which was lost at sea off the Philippine Islands in October 1965. The Kyowa Maru, purchased at a price of about

Japan (Contd.):

230 million yen (US\$639,000), will undergo extensive modifications and is expected to be ready for service by March 1966. (Suisan Tsushin, December 2, 1965.)

WHALING OPERATIONS AFFECTED BY LABOR DISPUTE:

Some of the Japanese whaling fleets in the Antarctic and the Bering Sea were hit by a 12-hour work stoppage on December 12, 1965, the opening day of the Antarctic season. The fleets of only one whaling company were affected. Involved were the Nisshin Maru and Nisshin Maru No. 3 fleets in the Antarctic (2 of the 5 Japanese fleets in the Antarctic) and the Tenyo Maru fleet in the Bering Sea.

The work stoppage arose out of a labor dispute in which processing workers in the whaling fleets were asking for a basic pay increase of ¥4,800 (US\$13.33) and a 30-percent increase over the previous season in special allowances. The whaling company had offered a basic increase of ¥3,000 (\$8.33) and a 7-percent increase in special allowances.

A Union representative said additional work stoppages might be called if negotiations failed to produce a settlement. The seamen involved are members of the All-Japan Seamen's Union which in early December 1965 was involved in a nationwide work stoppage. But seamen on the high seas, including the whaling fleets, had previously been exempted from the walk-out. (Japan Times, December 14, 1965.)



Republic of Korea

FIVE TUNA VESSELS ORDERED FROM WEST GERMANY:

South Korean interests have commissioned a West German shipyard in Leer to build five tuna long-line vessels, according to a report in the German periodical Allgemeine Fischwirtschafts-Zeitung, November 27, 1965. The first vessel, the No. 1 Kum Yong, is scheduled for completion early in 1966. The other four vessels are also expected to be delivered in 1966.

The vessels will have an overall length of about 115 feet. Length between perpendiculars will be about 100 feet, molded breadth about 20 feet, and draft about 8 feet. The vessels will measure under 200 gross registered tons and have a fish-hold for storing about 130 metric tons of fish. Each vessel will be equipped with freezing equipment with a capacity of 4 metric tons per hour. Each vessel will be powered by a diesel engine of 460 horsepower giving a cruising speed of 10 knots. Reportedly, the vessels will be capable of launching long lines with a maximum length of about 80 kilometers (50 miles). Perpendicular lines which carry hooks with bait are attached at intervals of about 25 meters (82 feet). The long line will be launched and hauled aboard with the help of a high-speed special winch manufactured in Japan.

The vessels will each carry a crew of 27 and are designed to remain at sea about 40 days. Reportedly, they will operate in southern Atlantic waters, landing their frozen catch in West Africa. (United States Consulate, Bremen, December 3, 1965.)



Mauritania

FISH-PROCESSING COMPLEX TO BE BUILT BY SPAIN:

Spain has agreed to construct three fish-processing plants in Port Etienne, Mauritania (West Africa), representing a capital investment of over US\$4 million. The money will be invested in return for preferential rights for Spanish fishermen in Mauritanian coastal waters. As a result, 100 to 200 Spanish fishing vessels will operate in inshore waters to supply the three plants.

To be constructed are (1) a fish-meal plant to process 100 metric tons of fish daily; (2) a canning plant with a yearly output of 3,000 tons; and (3) a salting and drying plant designed to produce 6,000 tons in its first year of operation. Construction of the meal and salting plants was to begin in November 1965.

Also called for is the construction by Spain of an administration building, houses, and schools for the plant workers and their fami-

Mauritania (Contd.):



lies. Further, the Spanish will train Mauritanian fishermen and will furnish 50 small trawlers to them. (United States Embassy, Nouakchott, October 16, 1965.)

Note: See *Commercial Fisheries Review*, February 1965 p. 83; July 1964 p. 67.



Morocco

TUNA FISHERY EXPANSION TRIED:

An expanded tuna fishery is desired by both Government and industry leaders in Morocco. All agree that the local industry needs larger, more modern vessels with much greater cruising range than the present fleet.

In the summer of 1964, the Moroccan Government contracted with a French group to supply the 300-ton refrigerated tuna vessel *Danguy* to investigate the possibilities of nearby tuna fishing grounds off Morocco. The *Danguy* was equipped with a purse-seine net 700 meters (2,296 feet) by 125 meters (410 feet) and carried out its research work for a year, ending the contract in September 1965. According to industry sources, the explorations of the *Danguy* were disappointing. Little tuna was caught in the areas investi-

gated, possibly because the *Danguy* encountered adverse weather and sea conditions close to the Moroccan coast.

In another attempt to expand the Moroccan tuna catch, a group of Agadir vessel owners in early 1965 sent an expedition of seven vessels to fish off Senegal and the Ivory Coast. The expedition gave the Moroccan captains and crews experience in extended long-range fishing, but it was not a financial success. The Agadir Chamber of Commerce has called for Government support for the owners of the vessels involved. The expedition reemphasized the need for larger Moroccan vessels equipped with refrigeration. (United States Embassy, Rabat, November 17, 1965.)

TANGIER CANNERY SHORT OF RAW TUNA FOR CANNING:

A tuna cannery in Tangier completed its second operating season in 1965, processing about 1,000 metric tons of bluefin tuna (*Thunnus thynnus*). The pack was put up in olive oil for domestic and export markets in Italy (imports 15 tons annually in 11-pound cans) and other European countries. At present, cost factors prevent the cannery from packing tuna in a style suitable for export to the United States.

A major problem for the cannery has been a shortage of tuna for canning. During May, June, and July, the cannery receives a total of about 700 tons of bluefin tuna from the madrague (fixed net) fishery off the Moroccan Atlantic coast. An additional 300 tons are trucked from Safi and Agadir to enable the cannery to operate for 6 months of the year. The average tuna caught by the madragues weighs about 400 pounds and some as much as 600 pounds each.

If it could operate year-round, the cannery could almost double its current production. Tuna supplies could be held until needed in the Tangier cold-storage plant which has freezing facilities and a cold-storage capacity of 1,100 square meters (38,846 square feet). Unfortunately, the short range of the Moroccan tuna fleet limits domestic supplies, and the importation of foreign tuna for processing and re-export is not profitable due to customs duties. (Moroccan customs authorities assess a duty on the gross weight of tuna imported even if it is to be canned for re-export.) Efforts to adapt the Moroccan tuna

Morocco (Contd.):

fleet for offshore fishing may help solve the problem. (United States Consulate, Tangier, December 1, 1965, and other sources.)

Note: See Commercial Fisheries Review, April 1964 p. 65.

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LOBSTER FISHERY

INVESTMENT OPPORTUNITY:

Moroccan interests in Asilah (about 25 miles south of Tangier on the Atlantic Coast) are seeking the assistance of United States firms in developing a lobster fishing venture.

A detailed scientific study of the lobster beds off northern Morocco has never been made. According to available information, lobster fishing with traps is conducted on a commercial scale near Asilah by three French vessels during March, April, and May. The catch varies from 2,000 to 6,000 lobsters (4 to 12 metric tons) a month. About 150 large basket-like traps are fished which usually yield 4 or 5 lobsters at each haul. The French vessels weigh about 37 tons and have a hold capacity of from 600 to 700 lobsters (1.2 to 1.4 tons). The vessels are licensed by the National Maritime Fishing Office and operate in rotation to take the lobster catch to Marseilles.

Reportedly, both lobster with claws (family Homaridae) and spiny lobster without claws (family Palinuridae) are found in Moroccan waters, the latter being the most common type. The spiny lobster weigh about 4 pounds each. Lobster have been reported in Moroccan territorial waters from Tangier to Kenitra. However, the best known Moroccan area for lobster fishing is a spot of about 4 square miles located 1 mile immediately offshore from Asilah, where the ocean depth is from 10 to 20 fathoms. Other areas where lobster are said to be plentiful are near Moulay, Bousseham, and Kenitra. The ocean floor is reportedly rocky all along the coast.

Only one Moroccan fisherman in Asilah specializes in lobster fishing. He said that he has caught up to 6,000 lobsters (about 12 tons) during the season which runs from February to October. (Lobster fishing is prohibited from October 1 to February 1 by the Moroccan National Maritime Fishing Office.) However, he uses a net and does not limit his fishing to the area immediately off Asilah. He said that he has sought unsuccessful-

ly to interest his fellow townsmen in forming a cooperative to build up a local industry based on lobster. They have so far been unable to raise the necessary capital, but are presently considering the possibility of obtaining credits from the Moroccan Government.

United States firms interested in more information about the lobster fishing investment opportunity should contact the United States Consulate General, No. 1, Place de la Fraternite, Casablanca, Morocco.

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EXPORT MARKETS SOUGHT FOR FISH PROTEIN CONCENTRATE:

A Moroccan fish protein concentrate (FPC) plant began trial operations in the spring of 1965. Annual production is expected to be 1,500 metric tons of FPC for human consumption. The Moroccan FPC company is seeking export markets for the bulk of its production. Although the Food and Agriculture Organization reports that the Moroccan FPC is of excellent quality, the company is having some difficulty finding markets, and production to date has been sold for animal feed. (United States Embassy, Rabat, November 17, 1965.)



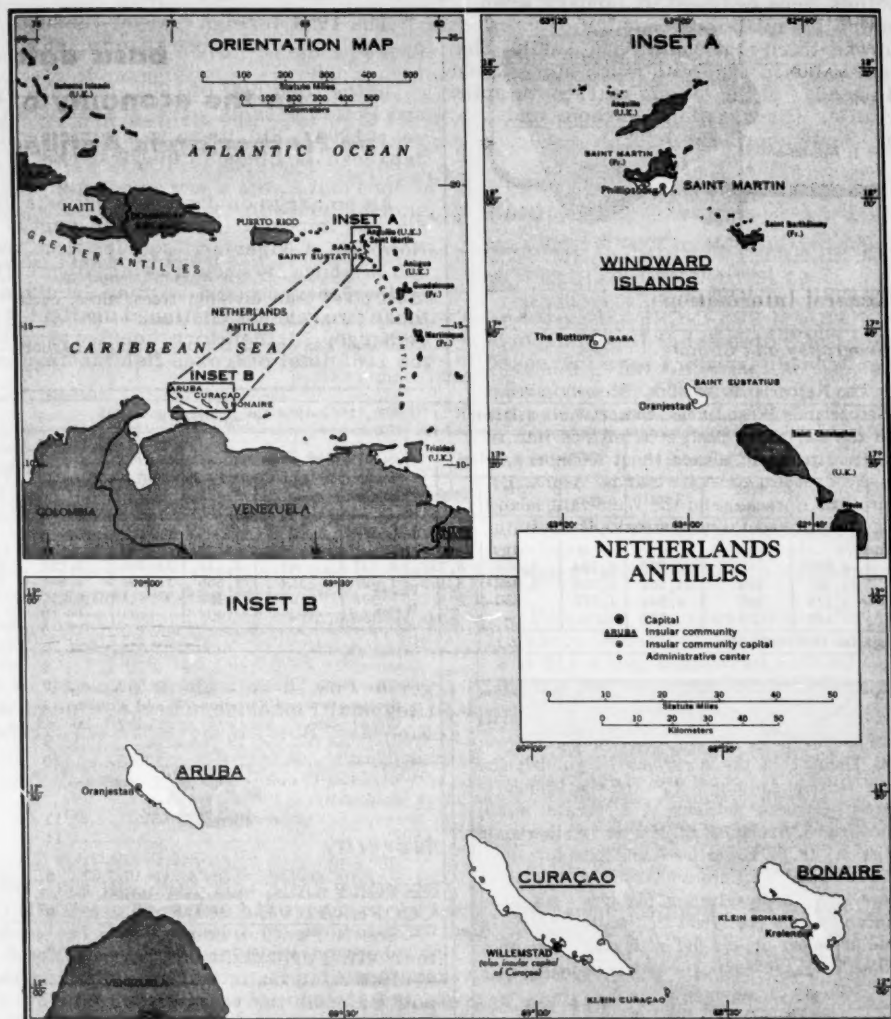
Netherlands West Indies

FISHERIES TRENDS AS OF JUNE 1965:

Cold-storage facilities with a capacity of 1,100 tons of fish were completed at Saint Martin Island (located east of Puerto Rico), Netherlands West Indies, about mid-1965 by Japanese interests. In addition, 100 tons of fish can be chilled in a separate room, and another 600 tons can be stored in one of the permanently based trawlers at the pier. In all, about 50 trawlers use the pier facilities. Between 10 and 15 trawlers land their catch at Saint Martin each month. The catch is processed on the premises and exported, principally to Puerto Rico and nearby islands, and also to the United States. Previous plans for a cannery were postponed for the time being.

The catch by local fishermen in the Netherlands Antilles islands off the coast of Venezuela has not been sufficient for the demand and this has resulted in increased imports of frozen fishery products.

Netherlands West Indies (Contd.):



The cultivation of clams along the island shores is being studied, and another study indicated that shrimp would probably thrive if introduced at specific points around Willemstad in Curacao. (United States Consulate, Curacao, June 4, 1965.)

Note: See *Commercial Fisheries Review*, August 1964 p. 81; May 1964 p. 69.



New Zealand

SPINY LOBSTER PRODUCTION, JANUARY-APRIL 1965:

New Zealand's landings of spiny lobster in January-April 1965 totaled 3.7 million pounds valued at US\$1.4 million (£500,346), an increase of 12 percent in quantity and 61 percent in value as compared with the same period in 1964.

New Zealand (Contd.):

Landings were heaviest in January when they totaled 1.4 million pounds but dropped to about one-third that quantity in April. The ex-vessel value in 1965 was much higher than in 1964 because of the strong market for spiny lobster tails. (New Zealand Harbour and Shipping, September 1965.)



Nigeria

FROZEN FISH LANDINGS BY
FOREIGN TRAWLERS INCREASE:

Landings of frozen fish at Nigerian ports by foreign freezer trawlers have increased

sharply since the beginning of this trade in 1962.

The 1964 foreign trawler landings were over 200 percent more than in 1963.

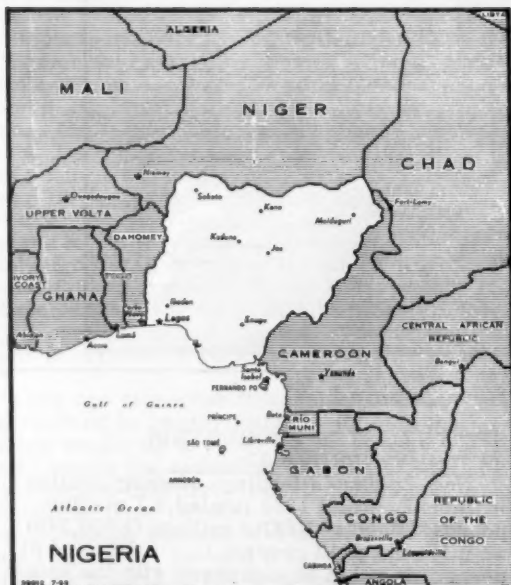
In the first half of 1965, landings by Soviet and Polish vessels were greater than in the year 1964. But there was some decline in Japanese landings in the first part of 1965.

An embargo on Japanese imports to Nigeria was imposed in the latter part of 1965. However, a Nigerian fisheries firm acquired two offshore freezer trawlers formerly used by the Japanese, and regular landings from those two vessels continued unaffected by the embargo. It therefore seemed probable that the 1965 total of frozen fish landings in Ni-

Landings of Frozen Fish by Foreign Trawlers in Nigeria, 1962-1964 and January-June 1965

Year	Japanese Trawlers			Soviet Trawlers			Polish Trawlers			Total Japanese, Soviet, and Polish Trawlers		
	Lagos	Port Harcourt	Total	Lagos	Port Harcourt	Total	Lagos	Port Harcourt	Total	Lagos	Port Harcourt	Total
Jan.-June 1965	4,950	-	4,950	6,294	1,858	8,152	2,117	-	2,117	13,361	1,858	15,219
1964	11,367	194	11,561	4,088	4,062	8,150	1,527	339	1,866	16,982	4,595	21,577
1963	4,179	365	4,544	1,272	850	2,122	396	-	396	5,847	1,215	7,062
1962	167	70	237	-	-	-	257	-	257	424	70	494

Source: Nigerian Port Authority.



geria would be well in excess of 1964. (Regional Fisheries Attache, United States Embassy, Abidjan, November 13, 1965.)



Norway

EXPORT SALES OF FROZEN FISH BY
COOPERATIVE GROUP AT RECORD LEVEL:

The Norwegian cooperative frozen fish marketing organization, Frionor Norsk Frosenfisk A/L, Oslo, had record home and export sales in the year ending June 30, 1965. Total sales by the firm, including subsidiary companies, were 48,300 metric tons worth US\$31 million. Exports amounted to 44,500 tons. Great Britain was the largest market. Of total production, 36,000 tons consisted of frozen fish fillets. (The Export Council of Norway, December 1965.)

Norway (Contd.):

**CANNED FISH EXPORTS,
JANUARY 1-JULY 24, 1965:**

Preliminary data show that Norway's total exports of canned fishery products during January 1-July 24, 1965, were down about 6 percent from those in the same period of 1964. Exports were somewhat lower in 1965 for smoked small sild, soft herring roe, and shellfish, but there was a small increase in shipments of brisling and kippered herring.

Norwegian Exports of Principal Canned Fishery Products,
Jan. 1-July 24, 1965, with Comparisons

Product	1965	1964
	Jan. 1-July 24	Jan. 1-July 25
	(Metric Tons)	
Brisling	3,458	3,392
Smoked small sild . .	7,160	7,572
Kippered herring . .	1,931	1,830
Soft herring roe . .	618	982
Sild delicatessen . .	326	240
Shellfish	741	961
Other fishery products	1,539	1,757
Total	15,773	16,734

In 1965, the Norwegian canning season opened on May 1 for small sild and on May 19 for brisling. By August 14, 1965, the pack was 258,615 standard cases of small sild and 258,910 standard cases of brisling. At the same date in 1964, the pack was 262,901 cases of small sild and 299,993 standard cases of brisling. The declines were due to disappointingly small catches of brisling and small sild suitable for canning. (*Norwegian Canners Export Journal*, September 1965.)

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**WHALE OIL OUTPUT DURING 1965/66
ANTARCTIC SEASON SOLD IN ADVANCE:**

The Norwegian press has reported the advance sale of all the whale oil produced by the two Norwegian expeditions during the 1965/66 Antarctic whaling season. The oil has been sold to European continental dealers and to the Norwegian marine oil hardening industry. (United States Embassy, Copenhagen, December 6, 1965.)

(Editor's Note: Output for 1965/66 is uncertain. Norway has only two whaling fleets in the Antarctic this season as compared with four fleets in 1964/65. The two Norwegian fleets operating in the Antarctic this season are reported to have produced about 17,700 metric tons of whale oil during the previous season. The Antarctic total catch quota for

all countries was reduced from 8,000 blue-whale units in 1964/65 to 4,500 units in 1965/66. By informal agreement, Norway was assigned 28 percent of the total quota in both seasons.)

Note: See *Commercial Fisheries Review*, Oct. 1965 p. 91; and June 1965 p. 69.

**Peru****FISH MEAL INDUSTRY TRENDS,
NOVEMBER-DECEMBER 1965:**

Anchoveta fishing improved markedly all along the Peruvian coast during the latter part of November 1965. Peruvian fish meal production in the last half of November 1965 was about 78,000 metric tons compared with only 38,590 tons during the first half of the month. (In 1964 production was 120,000 tons during the first half of November and 91,000 tons during the second half.)

The December 1965 catches included large numbers of small anchoveta which may be a sign of good catches in a few months.

Peruvian ex-vessel prices for anchoveta in early December 1965 were between US\$12 and \$14 a ton, compared with \$9 to \$10 a ton during the same period of 1964.

In early December 1965, Peruvian prices for fish meal declined to about \$150 a ton f.o.b. Peru. (United States Embassy, Lima, December 15, 1965.)

**Philippine Republic****FISH FARM DEVELOPMENT PROGRAM
TO BE FINANCED BY
AUSTRALIAN GROUP:**

The Australian Freedom-From-Hunger Campaign-Committee is to finance a 5-year fisheries program in the Philippines. Under the program, fresh-water and brackish-water fish and oyster farms are to be established to develop inland fisheries in the Philippines. (*Current Affairs Bulletin*, Indo-Pacific Fisheries Council, Food and Agriculture Organization, No. 43, August 1965.)



Rumania

ATLANTIC TRAWLING OPERATIONS SHIFTED TO WEST AFRICAN COAST:

In late 1965, the large Rumanian stern-trawler Galati was reported fishing for mackerel and other species off Morocco's southern coast. The vessel stopped at Casablanca for fuel and supplies. Earlier in 1965, the Galati and her sistership, the Costanta, had fished off the Atlantic coast of the United States. The Galati reportedly caught 500 metric tons of herring and some cod while in the Northwest Atlantic. (La Pêche Maritime, November 1965.)

Note: See Commercial Fisheries Review, Dec. 1965 p. 41; and April 1965 p. 82.



South Africa Republic

FISHERIES TRENDS, AUGUST-SEPTEMBER 1965:

Pelagic Fishery: On the Cape West Coast, the main pelagic fishing season closed with a catch for January-July 1965 of 441,097 short tons (mostly pilchard, maasbanker, mackerel, and anchovy). Anchovy fishing continued, but the catch was only 5,350 tons in August 1965 and 31,204 tons in September 1965. Including incidental pilchard and maasbanker catches, the Cape West Coast total shoal catch in January-September 1965 was 478,702 tons.

In the Territory of South-West Africa, the pilchard catch was 123,618 tons in July, 73,280 tons in August, and 17,968 tons in September 1965, bringing the pilchard catch for the Territory in January-September 1965 to 730,745 tons.

The total shoal catch for the South Africa Republic and the Territory of South-West Africa combined in January-September 1965 was 1,209,447 tons.

At Walvis Bay in South-West Africa all factories had completed their pilchard quota by the end of September 1965. The regular pilchard season in South-West Africa was not expected to resume until February 1966, although one factory had a special license to take 10,000 tons of pilchard for processing as frozen fillets for domestic and export markets. None of the Walvis Bay factories planned to fish for anchovy during the off-

season, but some of the factories were looking into other fisheries such as shrimp, lobster, and groundfish.

Shrimp and Spiny Lobster: Two pilchard factories at Walvis Bay have acquired interests in a company which has a concession to investigate the shrimp and spiny lobster potential in the area north and south of Walvis Bay. The project got under way in September 1965 with exploratory fishing by the fishing vessel Takbok. At the start the work was hampered by bad weather and considerable damage was done to nets.

Another group from Walvis Bay was also exploring for spiny lobster off the coast between the Hoanib and Kunene Rivers. Their initial efforts were unproductive.

Groundfish: During the off-season for pilchard, one Walvis Bay factory was conducting groundfish operations with three line-fishing vessels and the new fiberglass trawler Benguella Stroom. Another Walvis Bay factory was fishing for groundfish with the trawlers Karin and Gnufi.

Snoek: Several of the Walvis Bay factories planned to carry out their usual snoek fishing during the off-season for pilchard.

Research: Considerable expansion is being planned for the South-West Africa Administration marine research laboratory at Walvis Bay.

The laboratory is to acquire a new 145-foot all-steel research vessel which will be equipped for oceanographic work as well as for exploratory fishing with electronic gear. It will also be used for stern-trawl investigations of the groundfish resource.

The staff of the research laboratory is to be increased from 10 to 27. Six fishery inspectors are also to be appointed. (South African Shipping News and Fishing Industry Review, October and November 1965.)

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FOREIGN FISHING OPERATIONS OFF WEST COAST, NOVEMBER 1965:

Two additional nations--West Germany and Italy--have joined the eight foreign countries with established fishing operations off South-West Africa, according to a report in

South Africa Republic (Contd.):

the Namib Times, Cape Town, November 19, 1965. At that time the foreign fleets were said to be making excellent catches about 100 miles south of Walvis Bay. The foreign fleets have mostly concentrated on groundfish and shown little interest in pilchard. In 1966, British trawlers may begin fishing off South-West Africa. More West German and Soviet trawlers are also expected.

Following is a listing of the foreign vessels operating off South-West Africa in the fall of 1965, as reported in the Namib Times, November 19, 1965.

An Italian group operates the 1,000-ton Genepesca I. The vessel formerly operated off the coast of Labrador in the North Atlantic.

West Germany is represented by the 2,145-ton factory-trawler Sagitta Maris.

Two Israeli vessels--the Azgad 2 and the Azgad 3--are operating in the South Atlantic.

There is one Japanese vessel of about 2,500 tons.

The Soviets have a fleet of over 40 vessels off South Africa. Some of those are on lease to Ghana and Poland and, although flying the flags of those countries, are still manned mainly by Russians.

Bulgaria has two known trawlers operating off South Africa--the Feniks and the Albatross. It is understood that those vessels are to be joined by another four in 1966.

Spain has over 40 vessels fishing off South Africa, and that fleet may be expanded to 150 vessels in 1966.

Belgium has the stern-trawler Narwal operating off South Africa. The vessel can process up to 25 metric tons of fish a day. In mid-November 1965, the Narwal called at Walvis Bay where she transferred 120 tons of frozen fish to the Mohasi for shipment back to Antwerp.

Note: See Commercial Fisheries Review, Dec. 1965 p. 80.

SPINY LOBSTER TRANSPORT "GILLIAN GAGGINS" DELIVERED FOR FISHERY IN TRISTAN DA CUNHA ISLANDS:

The largest single vessel order ever placed with a South African shipyard was fulfilled

in mid-1965 when the 1,180-ton spiny lobster processing vessel Gillian Gaggins was handed over to her owners in Cape Town. The 162-foot floating factory and refrigerated transport is the largest vessel yet built for the South African fishing fleet.

Gillian Gaggins was built at a cost of about R500,000 (US\$700,000) to replace the 316-ton Francis Repetto which, with the Tristania, has been responsible for building up the spiny lobster fishing industry around the Tristan da Cunha group of islands in the middle of the South Atlantic.

The Tristan spiny lobster venture started with the expedition to the islands--Tristan da Cunha Geogh, Nightingale, and Inaccessible--of the 181-ton wooden vessel Pequena in 1948. The expedition was backed by a South African development company.

In 1949, the Pequena made her first commercial catch of spiny lobsters in the Tristan Islands, and the frozen tails she brought back were the first of a steady stream which has since flowed to markets in the United States. A year later the trawler Tristania was acquired for the operation. The pioneer ship Pequena was later withdrawn and replaced by the Francis Repetto, which in turn has now been replaced by the Gillian Gaggins, whose capacity for spiny lobster tails exceeds the total of the Francis Repetto and Tristan combined.

The Gillian Gaggins has an all-welded hull, and the latest prefabrication methods were used in her construction. The vessel has a range of 16,500 miles on one engine, or 11,700 miles on both engines. She will carry up to 75 men with fuel and supplies for extended periods. The vessel will receive spiny lobster catches and hold them at subzero temperatures until she returns to the Cape. (South African Digest, October 29, 1965.)

FISHERIES EXHIBITION IN OCTOBER 1966 PLANNED:

South Africa's first large exhibition of fishing gear and fish-processing equipment will be held at the Goodwood Showgrounds near Cape Town, October 11-15, 1966. The exhibition will be sponsored jointly by Government and industry.

The latest developments in equipment will be displayed including echosounding and electronic fish-finding gear.

South Africa Republic (Contd.):

Local and foreign suppliers are expected to exhibit.

The Southern African region offers a growing market to fishing industry suppliers. In an average year, the fishing industry in the South Africa Republic is said to need 40 or 50 new vessels. The trawling section of the industry is reported to spend R3.0 million (US\$4.17 million) a year on nets. A wide range of processing equipment is also needed.

The exhibition is timed to take place in the closed fishing season so that fishermen will be free to attend. Fishermen in the South Africa Republic, South-West Africa, Angola, Mozambique, and other fishing centers are to be invited to the exhibition.

The rate for any stand at the exhibition is R2.50 (\$3.48) per square foot. Shell stands will be provided for all exhibitors without charge. For additional information write to the South African Exhibition Organizers, (Pty.) Ltd., P. O. Box 667, Cape Town, South Africa Republic. (United States Consulate, Cape Town, November 23 and 30, 1965.)



Republic of Togo

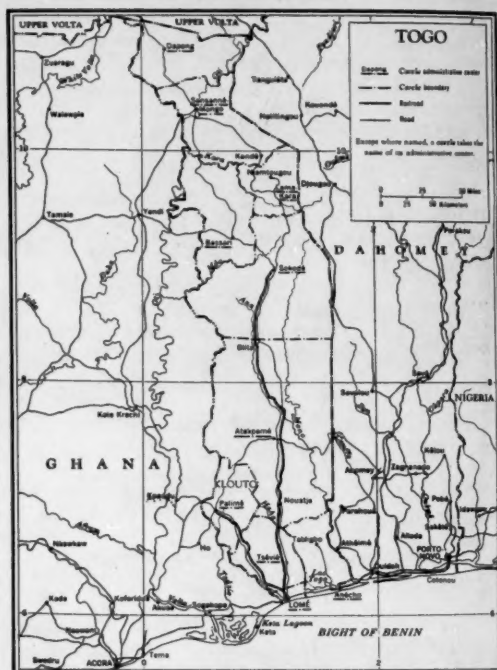
FISHERIES TRENDS, 1964-65:

Some progress was made in Togo's fisheries during 1965. By the latter part of the year, the fish dock planned for the Port of Lome was expected to be extended sufficiently so that it could provide protected docking facilities for fishing vessels.

A Togolese commercial fishery organization, the Societe Industrielle et Commerciale de Peche, was formed with local capital in early 1965, and there was interest by United States parties in the establishment of a shrimp cannery at the new port. Also, West Germany planned to provide two fishing vessels to be used for training local fishermen.

Japanese and Soviet fishing vessels operating off the African coast freeze part of their catch, and some is landed and sold along the coast. Most of the local fishing in Togo is done by villagers along the coast who either sell their catch locally or use it directly. As

a result, the catches are not recorded in official fishery statistics.



The value of Togo's fishery imports was up in 1964 but the quantity dropped 10 percent. Exports of fishery products are negligible and in 1964 they were even less, possibly indicating increased local consumption. (United States Embassy, Lome, May 24, 1965.)



Tunisia

FISHERIES DEVELOPMENT AIDED BY SWEDISH LOANS:

In 1963, Sweden signed an agreement with Tunisia providing for financial and technical assistance to develop a fishing harbor and a vocational school to train fishermen. The project is concentrated in the Kelibia District of northeastern Tunisia. The financial aid extended by Sweden under the agreement has been in the form of development credits to enlarge pier and harbor facilities to accommodate approximately 10 fishing trawlers and

Tunisia (Contd.):

a number of smaller boats. Sweden provides three-fourths and Tunisia one-fourth of the funds for the harbor works.

The first credit of SKr. 6.0 million (US\$1.16 million) was arranged in 1963. A second loan for SKr. 6.0 million was agreed to on October 22, 1965. Tunisia is to make the equivalent of a SKr. 2.0 million (\$386,100) contribution. Both Swedish loans bear a 2-percent interest rate and a 20-year maturity including a 5-year grace period. After the grace period the repayments during the first 10 years are scheduled to amortize 5 percent of the loan annually. (United States Embassy, Stockholm, October 29, 1965.)

Note: See Commercial Fisheries Review, May 1964 p. 74.



U.S.S.R.

SOVIETS PLAN 50-PERCENT INCREASE IN FISHERY LANDINGS BY 1970:

Soviet fishery landings of about 8.5 million metric tons in 1970 are called for by the preliminary 5-Year (1966-1970) Plan for Soviet fisheries development. Of that total, 7.8 million tons would be fish and shellfish, and the rest whales, marine animals, and other aquatic products. Most of the fish would be caught on the high seas. In 1964, the Soviet Union caught 4,475,000 tons of fish and 650,000 tons of other aquatic products. In 1965, the Sovi-

ets expected to land 5,600,000 tons of fish and other aquatic products. According to Soviet sources, most Soviet Fishery Administrations have fulfilled their individual 1965 quotas, and the actual 1965 landings may even surpass the planned estimates. (The Fishing News, London, November 19, 1965, and other sources.)

FREEZER-TRAWLER "ZAPOLJARNYJ"
DELIVERED TO SOVIETS
BY DANISH SHIPYARD:

The 2,570-ton freezer-trawler M/S Zapoljarnyj was delivered to V/O Sudimport, Moscow, by a Copenhagen shipyard November 25, 1965. Launched March 30, 1965, the vessel is part of a series of 15 freezer trawlers for the U.S.S.R. being built by the Danish shipyard to the following specifications: length between perpendiculars 91 meters (298.5 feet), breadth 16 meters (52.5 feet), and deadweight tonnage 2,550 to 2,600 metric tons. The first vessel in the series was the M/S Skryplev launched May 10, 1962.

The Zapoljarnyj can operate as a stern trawler, but it is designed primarily to operate as a freezership, receiving catches from other trawlers. The catches are headed, gutted, and frozen aboard the Zapoljarnyj. The vessel carries two heading machines, although dressing the fish is still mainly a hand operation. For freezing, the dressed fish are placed in metal pans with firmly fastened covers and conveyed through an air-blast freezer. The use of the metal pans apparently produces smooth blocks of fairly uni-



The freezership M/S Zapoljarnyj which can also be used as a stern trawler.

U.S.S.R. (Contd.):

form dimensions. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, December 2, 1965.)

Note: See Commercial Fisheries Review, June 1965 p. 79.

JAPAN LAUNCHES FIFTH IN SERIES OF FACTORYSHIPS FOR SOVIETS:

Severodonetsk, the fifth of eight 18,000-gross-ton factoryships being built for the U.S.S.R. by a Yokohama shipyard, was launched December 14, 1965. The vessel should be completed by July 1966. It will act as a mothership, supplying fuel and provisions to Soviet trawler fleets and processing their catches. Specifications of the vessel are length overall 174 meters (571 feet), depth 14.8 meters (48.5 feet), breadth 24 meters (79 feet), and main diesel engine 5,500 horsepower at 125 r.p.m. (Shipping and Trade News, December 16, 1965.)

Note: See Commercial Fisheries Review, July 1965 p. 94.

ANTARCTIC WHALING PLANS FOR 1965/66 SEASON:

As in the previous years, the Soviet Union sent four whale factoryships (with supporting catcher vessels) to take part in the 1965/66 Antarctic whaling season which opened December 12, 1965. Two of those factoryships were from the Soviet Black Sea port of Odesa (Sovetskaia Ukraina and Slava), one from the Soviet fishing port of Kaliningrad (Iurii Dolgorukii), and one from the Far Eastern port of Vladivostok (Sovetskaia Rossia).

The 1965/66 Antarctic catch quota for all nations was cut to 4,500 blue-whale units. The Soviet share of that quota is 900 units under an informal agreement with Norway and Japan. But the quota does not apply to sperm whales, so one Soviet Antarctic fleet will hunt sperm whales only. (The Fishing News, London, November 1965.)

Note: See Commercial Fisheries Review, Oct. 1965 p. 65.



United Arab Republic

SOVIET-EGYPTIAN FISHING AGREEMENT SIGNED:

A fishing agreement between the Soviet Union and the United Arab Republic (UAR)

was signed about mid-1965, according to a Cairo press report. A Soviet delegation had been in Cairo for about a week to carry out the negotiations.

The agreement calls for the Soviet Union to supply 17,000 metric tons of fish to the United Arab Republic during the 1965/66 fishing season, with the first shipment delivered at Suez and Alexandria during summer 1965.

The agreement includes a provision for conducting research for one year in uncovering new fishing grounds in the Mediterranean. Soviet experts were to go to Egypt to develop the fisheries and to establish a fisheries training center. Also, 200 Egyptian students and fishery people are expected to be sent to the Soviet Union to study fishing methods from 5 to 7 years. On their return to Egypt they will form the nucleus of a UAR College of Fisheries.

A joint UAR-Soviet fisheries development agreement in early 1964 called for the Soviets to furnish radar-equipped fishing vessels and training, and for the Egyptians to build a community on the Red Sea coast for both Soviet and Egyptian fishermen. The project it was said would cost LE 3 million (US\$6.9 million). Soviet and Egyptian vessels are to carry out coordinated fishing activities in the south Red Sea and Indian Ocean. (United States Embassy, Cairo, June 9, 1965.)



United Kingdom

SHRIMP FISHING VENTURE IN PERSIAN GULF SUPPORTED BY MOTHERSHIP:

The 1,200-ton freezer ship Ross Eastern Leader was scheduled to arrive in the Per-



Ross Eastern Leader shortly before sailing for the Persian Gulf.

United Kingdom (Contd.):

sian Gulf in late January 1966 to serve as a mothership for seven 70-foot shrimp trawlers based at Bahrain. The operation is backed by a British firm and managed by United States experts.

The Ross Eastern Leader will collect and freeze shrimp catches. It has a freezing capacity of 30 tons a day and a cold-storage capacity of 300 tons. The vessel was equipped in Florida by United States outfitters.

Note: See Commercial Fisheries Review, Dec. 1965 p. 78.

PLAICE REARING EXPERIMENT POINTS UP PROBLEMS OF MARINE FISH FARMING:

In August 1965, the British White Fish Authority began an unusual fish-farming experiment by moving some 200,000 young plaice from a hatchery in the Isle of Man to a Scottish sea loch at Ardtoe. An arm of the loch had previously been dammed in order to provide a holding pond of about 5 acres.

During transshipment from the Isle of Man, the death rate of the plaice, then about 20 millimeters (0.79 inches) in length, was low--approximately 16 percent.

The fish appeared to settle down well in their new outdoor environment and began to feed both in the holding pond, where they were kept at about 50 fish per square yard, and in the main pond, where the density was only about 5 fish per square yard.

Very soon after the introduction of the fish, however, heavy rains caused fresh water to enter the loch, and the salinity was much reduced. That, together with the large amount of organic matter which was brought down with the rain water, and the large concentration of organic matter in the sand which began to decompose, reduced the oxygen available to the fish in the water and caused heavy mortality.

Although the dam on the loch had been constructed to allow the salinity and oxygen of the nursery area to be regulated by running off the foul water and allowing fresh sea water into the enclosure, it was apparent that additional measures would have to be taken to provide ideal conditions for fish in the future.

Large numbers of predators also reduced the plaice population in the enclosure. An incursion of crab, eel, and other fish all preyed on the small plaice. This will require that either larger fish capable of avoiding the predators are introduced in the future, or that the predators are controlled more effectively.

The surviving plaice in the enclosure appeared to be growing well, and control measures were being established in readiness for the introduction of the next batch of fish in 1966.

The experiment pointed up some of the problems which have to be resolved before the new science of farming marine fish can be developed into a commercial technique of rearing plaice to marketable size. (Fishing News, October 1, 1965.)

FREEZER-TRAWLER "OTHELLO" LAUNCHED FOR HULL FIRM:

The freezer stern-trawler Othello was launched December 9, 1965, by a Scottish shipyard in Glasgow. The Othello is the first of four similar vessels being built in Glasgow for a British fishing firm at Hull. The new vessels will be the first complete freezer-ships in the Hull firm's fleet of more than 30 trawlers.

The main particulars of Othello are: length overall 224 feet, length between perpendiculars 194 feet, breadth moulded 39 feet, depth moulded to upper deck 25 feet, depth moulded to main deck 17½ feet, speed in service 13½ knots, fishroom cold-storage capacity 27,000 cubic feet, and crew accommodations for 51.

The vessel is equipped to remain at sea 58 days.

An all welded vessel, the Othello was built in prefabricated sections weighing 40 tons each, and then assembled on the slipway.

Othello is the first British stern trawler to be arranged with the main machinery space at the after end of the vessel. This enables the cold storage space to be placed amidships. Othello is to be powered by an 8-cylinder diesel engine which develops 2,350 horsepower at 400 r.p.m. She has a controllable-pitch propeller which can be controlled from the wheelhouse.

United Kingdom (Contd.):

The design of Othello is the result of extensive investigation by the owners and builders into the plans and performances of many contemporary stern trawlers, both British and foreign. As a result of the investigation, a hull form was developed and a model underwent a series of tests at the Feltham Tank of the British National Physical Laboratory (NPL). The owner's specification called for an "easy" motion in heavy seas, and the NPL tests demonstrated that Othello and her sisterships should be good sea boats. Passive water stabilization tanks are fitted to minimize roll and improve working conditions for the crew.

The Othello has a factory deck with a large clear area where filleting machinery can be installed if it is decided to turn the vessel in-

to a factoryship at a later date. Initially, the Othello's catch will be headed and gutted, and then frozen in vertical plate freezers discharging directly into the holds.

The upper deck aft has the trawl winch 80 feet from the top of the ramp, which will allow the trawl to be brought aboard quickly. Twin fish hatches with chutes to the factory deck are provided on either side of the ramp.

A control position is provided on the aft side of the wheelhouse for the skipper when hauling in gear. From this point he can control engines, steering, and the trawl winch with a clear view of the trawl winch and the upper deck aft.



TUNA-CHUTNEY DIP

Here's a dip that's really different! You'll really keep them guessing with this one. Canned tuna, one of America's favorite foods, combines with cream cheese and chutney in the tastiest, dippiest blend yet. Dip-wise, this is a thrifty as well as delectable snack. The Tuna Research Foundation reminds us that tuna's in good supply at good prices. Stock up so you're always prepared for unexpected guests.

Tuna-Chutney Dip is a snap to fix and it's all planned to make a lot for a big party. All you have to do is blend the mild, delicate tuna chunks with the other ingredients in a simple one-bowl operation. Serve with crackers, pretzels, or chips.

TUNA-CHUTNEY DIP

2 8-ounce packages cream cheese	$\frac{1}{4}$ teaspoon cayenne
$\frac{1}{2}$ cup mayonnaise	4 cans (6 $\frac{1}{2}$ or 7 ounces each) tuna
	in vegetable oil
$\frac{1}{4}$ cup prepared mustard	$\frac{1}{2}$ cup chopped chutney

Cream together cream cheese, mayonnaise, and mustard; stir in cayenne. Add tuna and chutney; blend well. Serve with crisp crackers. Makes about 5 cups of dip.



FEDERAL ACTIONS



Department of Commerce

ECONOMIC DEVELOPMENT ADMINISTRATION

FEDERAL FUNDS TO AID LAKE SUPERIOR COMMERCIAL FISHING INDUSTRY:

A sum of about \$170,000 to finance the "action phase" of a program to revive and diversify the Lake Superior commercial fishing industry was approved in December 1965 by the Economic Development Administration (EDA), U. S. Department of Commerce. The funds were included in the first projects approved by the newly established agency.

The EDA was set up under the Public Works and Economic Development Act of 1965 which provides financial assistance to create permanent new jobs in those areas of the nation suffering from high unemployment or low family income. EDA's technical assistance program, which will finance the Lake Superior project, helps provide the information needed to solve problems blocking economic growth.

The total cost of the Lake Superior program is estimated at \$200,000, with the Bureau of Commercial Fisheries, U. S. Department of Interior, paying the remainder. The traditional fishery of Lake Superior includes the northern portions of Michigan, Minnesota, and Wisconsin. Depredations by sea lampreys of lake trout and whitefish have caused a gradual decline of the fishing industry since 1954. With the near extinction of the higher value lake trout and whitefish, lower value species such as herring, smelt, chub, and alewife have become more numerous.

The EDA project is designed to develop effective means for producing, processing, and marketing the lower value species that are now abundant, thereby creating new jobs and additional income for the area.

An earlier study by the U. S. Bureau of Commercial Fisheries proposed the "action

program" which will involve setting up a pilot processing plant to produce and market new food items from Great Lakes fish that are available. Improved trawling techniques and other fishing methods will be tested.

STUDY APPROVED TO HELP EXPAND LOUISIANA CRAYFISH INDUSTRY:

A technical assistance study to help expand the fresh-water crayfish industry in Louisiana was approved December 13, 1965, by the Economic Development Administration (EDA) of the U. S. Department of Commerce. The EDA study will be carried out over the next 12 months by the Department of Food Science and Technology, College of Agriculture, Louisiana State University, Baton Rouge.

The project, to cost about \$40,000, will determine the feasibility of establishing freezing and canning plants for processing crayfish. Such plants would increase job opportunities and income in the area by providing new outlets for an existing natural resource.

Some small-scale freezing and canning of crayfish does exist in Louisiana, but for all practical purposes, processed crayfish can be viewed as a new product in search of new markets.

Processing plants to be set up as a result of the survey would benefit present and future crayfish growers. That includes those farmers who grow and harvest crayfish in conjunction with rice farming. The plants would locate near the managed crayfish swamps, ponds, and rice farms.

The project will have a statewide impact. However, its principal economic benefit would accrue to areas in the south-central and western parts of the State, including the parishes of St. Martin, Lafayette, Acadia, Pointe Coupee, and St. Landry. Those areas qualify for financial assistance under the

EDA program because of high unemployment and low family income.



Department of the Interior

COMMERCIAL FISHERIES RESEARCH AND DEVELOPMENT ACT

FEDERAL AID AUTHORIZED FOR HURRICANE DAMAGE TO LOUISIANA OYSTER FISHERY:

In an announcement dated December 3, 1965, published in the Federal Register, December 8, 1965, the Secretary of the Interior determined that Hurricane Betsy of September 9, 1965, caused extensive damage to the Louisiana oyster resource and industry through silting, covering with marsh grass, and littering with debris of State and private oyster grounds.

The notice as it appeared in the Federal Register follows:

DEPARTMENT OF THE INTERIOR

Office of the Secretary LOUISIANA

Determination of a Fishery Failure Due to a Resource Disaster

DECEMBER 3, 1965.

Whereas, many firms and individuals are engaged in raising, harvesting, processing, and marketing oysters in the State of Louisiana; and

Whereas on September 9, 1965, Hurricane Betsy passed directly over the heart of Louisiana's oyster grounds, subjecting the area to a tidal wave and extreme winds which caused extensive damage to the oyster resource and industry through silting, covering with marsh grass, and littering with debris of State and private oyster grounds; and

Whereas, insurmountable uninsured losses of oyster production in the 1965-66 season will amount to a several million dollar decrease in State income; and

Whereas, the serious disruption of the Louisiana oyster fishery caused by alteration of habitat was due to natural causes;

Now, therefore, as Secretary of the Interior, I hereby determine that the foregoing circumstances constitute a commercial fishery failure due to a resource disaster within the meaning of section 4(b) of Public Law 88-309. Pursuant to this determination, I hereby authorize the use of funds appropriated under the above legislation to rehabilitate, restore, and put back into production the oyster grounds of the State of Louisiana, and for such other measures as may be necessary to mitigate the damage to the resource.

STEWART L. UDALL,
Secretary of the Interior.

FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

REVISED U. S. STANDARDS FOR FROZEN RAW BREADED SHRIMP-- REQUIREMENTS FOR CONDITION OF COATING STILL BEING EVALUATED:

The revised U. S. Standards for Grades of Frozen Raw Breaded Shrimp are being phased in gradually. The revised standards became effective September 3, 1965, EXCEPT that the requirements for (1) uniformity and (2) degree of dehydration did not become effective until December 1, 1965, AND the requirements for condition of coating will not become effective until February 7, 1966. That delay will give the breaded shrimp industry an opportunity to submit data to support their position for modification of the condition of coating (batter and breading) provision. This involves the requirement of 50 percent of shrimp material for "regular breaded shrimp" and 65 percent of shrimp material for "light-breaded shrimp."

The notice that the requirements for condition of coating would not become effective until February 7, 1966, published in the Federal Register, December 9, 1965, follows:

Title 50—WILDLIFE AND FISHERIES

Chapter II—Bureau of Commercial Fisheries, Fish and Wildlife Service, Department of the Interior

SUBCHAPTER C—PROCESSED FISHERY PRODUCTS, PROCESSED PRODUCTS THEREOF, AND CERTAIN OTHER PROCESSED FOOD PRODUCTS

PART 262—U. S. STANDARDS FOR GRADES OF FROZEN RAW BREADED SHRIMP

On Tuesday, August 3, 1965, there was published in the FEDERAL REGISTER, pages 9644-9647, inclusive, Part 262—U. S. Standards for Grades of Frozen Raw Breaded Shrimp.

A request has been received from the National Shrimp Breaders Association, an organization representing about 80 percent of the processors of frozen raw breaded shrimp within the United States, for modification of provision of the standard pertaining to condition of coating. It is their view that the present provision is too stringent to be met, on a practical basis. Accordingly, the first two paragraphs of page 9645 of the FEDERAL REGISTER of August 3, 1965, are hereby amended to read as follows:

This part shall become effective at the beginning of the 1st calendar day following the date of this publication in the FEDERAL REGISTER, Except: That the re-

quirements for condition of coating shall become effective at the beginning of the 60th calendar day following the date of this publication in the FEDERAL REGISTER. This will give the breaded shrimp industry an opportunity to submit data to support their position for modification of the condition of coating provision.

Breaded shrimp inspected and graded in accordance with this revised part between the 1st and the 60th day following the date of this publication in the FEDERAL REGISTER shall meet the requirements for condition of coating as provided in Part 262—U.S. Grade Standards for Raw Breaded Shrimp and published in the FEDERAL REGISTER (25 F.R. 8444) dated September 1, 1960, as amended by interim regulations published on page 7444 of the FEDERAL REGISTER dated June 5, 1965.

DONALD L. McKERNAN,
Director,
Bureau of Commercial Fisheries.
DECEMBER 3, 1965.

* * * * *

APPLICATIONS FOR FISHING VESSEL LOANS:

The following applications have been received for loans from the U. S. Fisheries Loan Fund to aid in financing the construction or purchase of fishing vessels:

John L. Finley, Box 2258, Kodiak, Alaska 99615, for the purchase of a new 29-foot wood seine vessel to engage in the fishery for salmon in southwestern Alaskan waters. Notice of the application was published by the U. S. Bureau of Commercial Fisheries in the Federal Register, December 4, 1965.

Parks Canning Co., Inc., 309 Colman Building, Seattle, Wash. 98104, for the purchase of a used 82.3-foot wood vessel to engage in the fishery for king crab in Alaskan waters. Notice of the application was published in the Federal Register, December 4, 1965.

Herbert H. Hunter, Jr., Star Route, Box 5, Brownsville, Tex. 78520, for the purchase of a used 61.6-foot wood shrimp trawler to engage in the fishery for shrimp in the Gulf of Mexico. Notice of the application was published in the Federal Register, December 7, 1965.

Walter E. Wallin, 2145 Notre Dame Drive, Eureka, Calif., for the purchase of a used 43-foot wood vessel to engage in the fishery for salmon, crab, shrimp, and tuna. Notice of the application was published in the Federal Register, December 8, 1965.

James Edward Johnson, 914 Fifth, Spenard, Alaska, for the purchase of a new 31-foot gill-net vessel to engage in the fishery for salmon in the Cook Inlet area of Alaska. Notice of the application was published in the Federal Register, December 8, 1965.

Chad B. Wyatt, Wrangell, Alaska, for the purchase of a used 61.4-foot wood vessel to engage in the fishery for salmon in Southeast Alaska. Notice of the application was published in the Federal Register, December 8, 1965.

Howard Clifton Aaker, Salmon Bay Terminal, Seattle, Wash., for the purchase of a used 43.5-foot registered length wood trolling vessel to engage in the fishery for salmon and albacore in the waters of the Pacific Ocean and Gulf of Alaska. Notice of the application was published in the Federal Register, December 15, 1965.

Merlin, Inc., Port Isabel, Tex. for the purchase of a used 64.5-foot registered length steel shrimp trawler to engage in the fishery for shrimp in the Gulf of Mexico. Notice of the application was published in the Federal Register, December 17, 1965.

Regulations and procedures governing fishery loans have been revised and no longer require that an applicant for a new or used vessel loan replace an existing vessel (Public Law 89-85; Fisheries Loan Fund Procedures--50 CFR Part 250, as revised August 11, 1965). Note: See Commercial Fisheries Review, January 1966 p. 101.

* * * * *

HEARINGS ON APPLICATIONS FOR FISHING VESSEL CONSTRUCTION DIFFERENTIAL SUBSIDY:

The following firms have applied for fishing vessel construction differential subsidies under the Fishing Fleet Improvement Act of 1964:

Firm and address	Overall Size	Fisheries	Hearing Notice in <u>Federal Register</u> 1965	Date of Hearing 1966
Lepire Fishing Corp. 356 County St. New Bedford, Mass.	90 ft.	scallops, flounder, lobster, groundfish	Dec. 14	Feb. 1
Margaret, Inc. Reedville, Va.	172 ft.	menhaden and other herring-like fish	Dec. 14	Feb. 3
Tonnesen Fisheries, Inc. North Dartmouth, Mass.	90 ft.	scallops, flounder, lobster, groundfish, swordfish	Dec. 15	Feb. 8
Amagansett, Inc. Amagansett, Long Island, N. Y.	152 ft.	menhaden, herring and herring- like fish, red hake, and miscel- laneous species for industrial uses.	Dec. 21	Feb. 10

Hearings on the economic aspects of the applications were scheduled to be held in Washington, D. C.

By letter dated November 29, 1965, Wallace J. Boudreaux, Brownsville, Tex., wished to amend his previously approved application for a fishing vessel construction differential subsidy to aid in the construction of an 82-foot steel trawler to engage in the fishery for shrimp, including royal-red shrimp, Atlantic tuna, snapper, and spiny lobster. The request to amend the application was to increase the size of the proposed vessel to an overall length of 95 feet and to increase the engine and freezer capacity. A hearing on the amended application was scheduled to be held.

The U. S. Bureau of Commercial Fisheries published the notice of the hearing in the Federal Register, December 10, 1965.

Note: See Commercial Fisheries Review, January 1966 p. 102



U. S. Tariff Commission

COMMENTS INVITED ON IMPORT DUTIES FOR CANNED CLAMS:

The United States Tariff Commission has started, pursuant to section 332 of the Tariff Act of 1930, an investigation with respect to canned clams (Schedule 1, part 3E, headnote 1; item 114.05), which for import duty purposes are subject to the American selling price basis of valuation.

This investigation is being made to determine those rates of duty for canned clams which, in the absence of the headnote provisions cited above, would in the judgment of the Commission have provided an amount of collected duty on imports of such products during a recent period substantially equivalent to that amount provided under such headnote. The Commission is also trying to determine the degree of protection, if any, afforded by the American selling price basis of valuation.

As of late December 1965, no hearing had been ordered. However, written comments were to be submitted by interested parties to the U. S. Tariff Commission not later than January 24, 1966. The Commission expected to publish in due course a list of converted

rates of duty for canned clams, and to order a public hearing.



Eighty-Ninth Congress (Second Session)



CONGRESS CONVENES: The second session 89th Congress convened on Jan. 10, 1966. Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to com-

mittees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.

President Johnson, Jan. 12, 1966, delivered his message on the state of the Union before a joint session of both houses. The message was referred to the Committee of the Whole House on the State of the Union and ordered printed as a House document (H. Doc. 321).

ANTIDUMPING ACT AMENDMENT: H. R. 11888 (Horton) introduced in House Jan. 10, 1966, to amend the Antidumping Act, 1921; to Committee on Ways and Means.

COLORADO RIVER STORAGE PROJECT: House received Jan. 10, 1966, a letter from the Assistant Secretary of the Interior transmitting the ninth annual report on the status of the Colorado River storage project and participating projects, pursuant to 70 Stat. 105; to Committee on Interior and Insular Affairs.

COMMODITY PACKAGING AND LABELING: Introduced in House H. R. 11982 (Roybal) Jan. 12, 1966, and H. R. 12043 (Howard) Jan. 13, to regulate interstate and foreign commerce by preventing the use of unfair or deceptive methods of packaging or labeling of certain consumer commodities distributed in such commerce, and for other purposes; to Committee on Interstate and Foreign Commerce.

ELECTION OF MERCHANT MARINE AND FISHERIES CHAIRMAN: House Jan. 10, 1966, adopted H. Res. 830, electing Representative Garmatz of Maryland as Chairman of the standing Committee on Merchant Marine and Fisheries.

EULOGY TO REP. H. C. BONNER: On Jan. 12, 1966, numerous members of the House eulogized Rep. Bonner, Chairman of the House Committee on Merchant Marine and Fisheries for almost 11 years.

FEDERAL WATER POLLUTION CONTROL ACT AMENDMENT: H. R. 11917 (Reuss) introduced in House Jan. 10, 1966, to amend the Federal Water Pollution Control Act to authorize increased appropria-

tions for assisting construction of municipal sewage treatment works, and to strengthen authority to enforce pollution abatement; to Committee on Public Works.

H. R. 11999 (Halpern) introduced in House Jan. 12, 1966, to amend section 8 of the Federal Water Pollution Control Act to increase to \$250 million the authorization for fiscal year 1967, and to authorize reimbursement of States that prefinance certain treatment works; to Committee on Public Works. Rep. Halpern in Congressional Record, Jan. 14, 1966 (p. 125), pointed out that the bill would enable the State to set about implementing its programs immediately by authorizing reimbursement to the State of the full Federal share of the costs of eligible construction projects.

FOOD PASTEURIZATION, PROTEIN CONCENTRATE, AND FREEZE-DRY FOOD PROCESSING: Rep. Hanna in extension of remarks, Congressional Record, Jan. 12, 1966 (pp. 112-114), spoke from the floor of the House concerning new developments in food technology which can produce protein foods high in quality, low in price, and easily distributed. These three food frontiers follow:

Pasteurization of Food Products. This method involves treatment by radiation rays of certain active elements to lengthen the shelf life or storage and distribution life of foods. Experiments started some years ago and are now at a stage for dramatic application for food processing. Rep. Hanna stated that the Technological Laboratory of the U. S. Bureau of Commercial Fisheries, Gloucester, Mass., prepared a report which showed how fresh fish treated by the gamma rays reduced by 99 percent the deteriorating bacteria which causes decay, and in this sterilized condition such fish could maintain their fresh state over a sustained period without measurable loss of flavor or food quality. Rep. Hanna stated that another promising approach to food pasteurization and sterilization lies in recent experiments being conducted with high frequency waves varying from the ultrasonic to the X-ray.

Protein Concentrates: Experiments in this technology have been occurring in both cereal grains and in fish products. Congress has provided the U. S. Bureau of Commercial Fisheries with funds to tackle the technological problem of producing a defatted, dehydrated, stable fish protein concentrate under hygienic conditions suitable for human consumption. This research is now being carried out on a pilot plant scale. A Massachusetts firm is already a major private producer of fish powder which when ultimately refined is an odorless, tasteless white powder compound. The powder can be made of many varieties of fish, including many of the so-called scrap fish.

Freeze-Dry Food Processing: This process produces a food output which is extremely light of weight. The food product is first frozen, then all the water is extracted under very critical vacuum conditions. The product resulting, when packaged to prevent penetration of either moisture or air, will preserve perfectly for from 3 to 5 years. With the introduction of fresh water the food becomes reconstituted as when it was itself fresh. Already numerous plants in the United States are processing chicken, shrimp, and coffee by the freeze-dry method.

NORTHWEST ATLANTIC FISHERIES ACT OF 1950: House received Jan. 10, 1966, a letter from the Assistant Secretary for Congressional Relations, Department of State, transmitting a draft of proposed legislation to amend the Northwest Atlantic Fisheries Act of 1950 (P. L. 845-81); to Committee on Foreign Affairs.

OCEANOGRAPHY: Rep. St. Onge in extension of remarks Congressional Record, Jan. 12, 1966 (pp. A76-A77) inserted in the Record an address titled "Our Deep Sea Frontier" which was delivered by Roger Lewis, president of General Dynamics at the 63rd anniversary dinner of the Navy League of the United States, held in New York on Oct. 27, 1965.

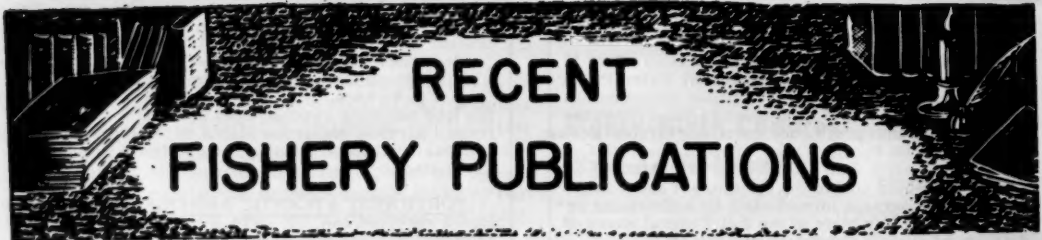
SMALL BUSINESS DISASTER LOANS: H. R. 11901 (Horton) introduced in House Jan. 10, 1966, to amend the Small Business Act to provide for increased eligibility for and greater utilization of the displaced business disaster loan program established under section 7(b) (3) of that act; to Committee on Banking and Currency.

UMPQUA PROJECT, OREGON: H. R. 11882 (Duncan of Oregon) introduced in House Jan. 10, 1966, to authorize the Secretary of the Interior to construct, operate, and maintain the Olalla division of the Umpqua project, Oregon, and for other purposes; to Committee on Interior and Insular Affairs.

WILLAMETTE RIVER PROJECT, OREGON: H. R. 11938 (Wyatt) introduced in House Jan. 10, 1966, to authorize the Secretary of the Interior to construct, operate, and maintain the Monmouth-Dallas division, Willamette River project, Oregon, and for other purposes; to Committee on Interior and Insular Affairs.

Note: REPORT ON FISHERY ACTIONS IN 89TH CONGRESS: The U. S. Bureau of Commercial Fisheries has issued a leaflet on the status of most legislation of interest to commercial fisheries at the end of the 1st session of the 89th Congress. For copies of MNL-3--"Legislative Actions Affecting Commercial Fisheries, 89th Congress, 1st Session 1965," write to the Fishery Market News Service, U. S. Bureau of Commercial Fisheries, 1815 No. Fort Myer Drive, Rm. 510, Arlington, Va. 22209. A few copies of MNL-3--"Legislative Actions Affecting Commercial Fisheries, 88th Congress, 1st Session and 2nd Session 1964," are also available upon request. Requests for this leaflet will be filled on a first-come first-served basis until the supply is exhausted.





FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE OFFICE OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON, D. C. 20402. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.
SL - STATISTICAL LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SSR - FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).

- | Number | Title |
|----------|---|
| CFS-3778 | - Industrial Fishery Products, 1964 Annual Summary (Revised), 9 pp. |
| CFS-3897 | - North Carolina Landings, July 1965, 4 pp. |
| CFS-3915 | - South Carolina Landings, July 1965, 2 pp. |
| CFS-3919 | - New England Fisheries, 1964 Annual Summary, 11 pp. |
| CFS-3922 | - Georgia Landings, July 1965, 2 pp. |
| CFS-3926 | - Maryland Landings, July 1965, 4 pp. |
| CFS-3929 | - Gulf Fisheries, 1964 Annual Summary, 16 pp. |
| CFS-3930 | - Fish Meal and Oil, August 1965, 2 pp. |
| CFS-3932 | - Maine Landings, August 1965, 4 pp. |
| CFS-3933 | - New Jersey Landings, July 1965, 3 pp. |
| CFS-3934 | - New Jersey Landings, August 1965, 3 pp. |
| CFS-3935 | - Rhode Island Landings, May 1965, 3 pp. |
| CFS-3936 | - Texas Landings, May 1965, 2 pp. |
| CFS-3938 | - South Carolina Landings, August 1965, 3 pp. |
| CFS-3939 | - Frozen Fishery Products, September 1965, 7 pp. |
| CFS-3940 | - Hawaii Fisheries, 1964 Annual Summary, 4 pp. |
| CFS-3941 | - Michigan, Ohio & Wisconsin Landings, July 1965, 4 pp. |
| CFS-3943 | - Alabama Landings, August 1965, 3 pp. |
| CFS-3944 | - Maryland Landings, August 1965, 4 pp. |
| CFS-3945 | - Massachusetts Landings, February 1965, 7 pp. |
| CFS-3947 | - Rhode Island Landings, June 1965, 3 pp. |
| CFS-3948 | - New York Landings, August 1965, 4 pp. |
| CFS-3949 | - Louisiana Landings, August 1965, 3 pp. |
| CFS-3950 | - Massachusetts Landings, March 1965, 7 pp. |
| CFS-3951 | - Shrimp Landings, April 1965, 5 pp. |
| CFS-3952 | - California Landings, July 1965, 4 pp. |
| CFS-3953 | - North Carolina Landings, September 1965, 4 pp. |
| CFS-3955 | - Florida Landings, September 1965, 8 pp. |
| CFS-3956 | - Mississippi Landings, July 1965, 3 pp. |

- CFS-3957 - Fish Meal and Oil, September 1965, 2 pp.
CFS-3958 - Mississippi Landings, August 1965, 3 pp.
CFS-3959 - Gulf Coast Shrimp Data, April 1965, 19 pp.
CFS-3963 - Michigan, Ohio & Wisconsin Landings, August 1965, 4 pp.
CFS-3964 - Rhode Island Landings, July 1965, 3 pp.
CFS-3965 - New Jersey Landings, September 1965, 3 pp.
CFS-3968 - Texas Landings, June 1965, 3 pp.

SL-22 - Wholesale Dealers in Fishery Products, Oregon, 1964 (Revised), 4 pp.

Sep. No. 749 - New Approaches to Quality Changes in Fresh-Chilled Dressed Halibut.

Sep. No. 750 - Wade Seine Construction and Method of Use.

Sep. No. 751 - Technical Note No. 2 - An Inexpensive Scallop Cleaner Built from Spare Parts

SSR-Fish. No. 506 - Table of Sigma-t and Intervals of 0.1 for Temperature and Salinity, by Betty Ann L. Keala, 187 pp., April 1965.

SSR-Fish. No. 510 - Collections by the Exploratory Fishing Vessels Oregon, Silver Bay, Combat, and Pelican, Made During 1956-1960, in the Southwestern North Atlantic, by Harvey R. Bullis, Jr., and John R. Thompson, 133 pp., Aug. 1965.

SSR-Fish. No. 514 - Biological-Statistical Census of the Species Entering Fisheries in the Cape Canaveral Area, by William W. Anderson and Jack W. Gehring, 89 pp., illus., July 1965.

SSR-Fish. No. 516 - Distribution of Fishes in U. S. Streams Tributary to Lake Superior, by Harry H. Moore and Robert A. Braem, 65 pp., illus., July 1965.

Annual Report of the Bureau of Commercial Fisheries Technological Laboratory, Gloucester, Mass., for the Fiscal Year Ending June 30, 1963, by Joseph W. Slavin, Circular 231, 17 pp., processed. Provides summaries of research on the chemistry and biochemistry of fish; preservation and processing; standards and specifications research and development; radiation-pasteurization; and inspection and certification of fishery products. Also lists publications and papers presented at meetings.

Biological Laboratory, Galveston, Texas, Fishery Research for the Year Ending June 30, 1964, Circular 230, 113 pp., illus., processed, 1964. An annual progress report on some of the research highlights

for the year. Includes a section that discusses research on the distribution, abundance, and ecology of commercially important shrimp, and the shrimp dynamics program. The section on industrial fish discusses life histories of north-central Gulf bottomfish and western Gulf bottomfish resources. The estuarine program, experimental biology program, and operation and maintenance of salt-water laboratories are also reported upon.

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

California Fishery Market News Monthly Summary.

Part I - Fishery Products Production and Market Data, October 1965, 16 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; prices for fish meal, oil, and solubles; for the month indicated.

California Fishery Market News Monthly Summary.

Part II - Fishing Information, October 1965, 12 pp., illus. (U. S. Bureau of Commercial Fisheries, Tuna Resources Laboratory, P. O. Box 271, La Jolla, Calif. 92038.) Contains sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists; for the month indicated.

Gulf of Mexico Monthly Landings, Production and Shipments of Fishery Products, September and October 1965, 9 pp. each. (Market News Service, U. S. Fish and Wildlife Service, Rm. 608, 600 South St., New Orleans, La. 70130.)

Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; Gulf menhaden landings and production of meal, oil, and solubles; fishery imports at Mobile, Ala., Morgan City and New Orleans, La., Miami, Fla., and Houston, Port Isabel, and Brownsville, Tex.; and sponge sales; for the months indicated.

Halibut and Troll Salmon Landings and Ex-Vessel

Prices for Seattle, Alaska Ports and British Columbia, 1965-1964, 35 pp., 1965. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Bldg., Seattle, Wash. 98104.) Gives landings and ex-vessel prices of troll salmon and halibut at leading United States ports of the Pacific Coast; ex-vessel halibut prices and landings at leading British Columbia ports; United States and Canadian Pacific Coast halibut landings, 1936-1965, halibut landings at leading Pacific Coast ports, 1962-1965; and troll salmon landings and receipts at Seattle and Alaska ports, 1962-1965.

Monthly Summary of Fishery Products Production in

Selected Areas of Virginia, North Carolina, and Maryland, October 1965, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, P. O. Box 447, Hampton, Va. 23369.) Landings of food fish and shellfish and production of crab meat and shucked oysters for the Virginia areas of Hampton Roads,

Chincoteague, Lower Northern Neck, and Lower Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data on fishery products and shrimp production; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly

Summary--August, September, and October 1965, 19 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 346 Broadway, New York, N. Y. 10013.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, including both the salt- and fresh-water sections; imports entered at New York customs district; primary wholesalers' selling prices for fresh, frozen, and selected canned fishery products; marketing trends; and landings at Fulton Fish Market docks and Stonington, Conn.; for the months indicated.

(Seattle) Washington and Alaska Receipts and Landings

of Fishery Products for Selected Areas and Fisheries, Monthly Summary, October 1965, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle, Wash. 98104.) Includes Seattle's landings by the halibut and salmon fleets reported through the exchanges; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl receipts reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington customs district; for the month indicated.

New England Fisheries--Monthly Summary, October

1965, 21 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston, Mass. 02210.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, and Provincetown), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by species; for the month indicated.

THE FOLLOWING SERVICE PUBLICATION IS FOR SALE AND IS AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, U. S. GOVERNMENT PRINTING OFFICE, WASHINGTON, D. C. 20402.

The Progressive Fish-Culturist, vol. 27, no. 4, October

1965, 74 pp., processed, single copy 25 cents. Some of the articles are: "The design, operation, and testing of a photoelectric fish egg counter," by Allen S. Davis and Gerald J. Paulik; "Observations on grass carp in Arkansas," by James H. Stevenson; "Preliminary studies with grass carp for aquatic weed control," by James W. Avault, Jr.; "Grass carp for weed control," by F. T. K. Pentelow and B. Scott; "Coho salmon smolts in ninety days," by Robert L. Garrison; "Tags for marking king crabs," by George W. Gray, Jr.; and "Tank facilities for tuna behavior studies," by John J. Magnuson.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILD-LIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ALASKA:

The following Statistical Leaflets available from Alaska Department of Fish and Game, Subport Bldg., Juneau, Alaska:

Alaska Commercial Fisheries Catch and Production Statistics, 1964, No. 9, 30 pp., processed, September 1965.

Alaska Commercial Fishery Operators, 1964, No. 8, 23 pp., processed.

AMINO ACIDS:

"Free amino acids in the muscle of a few species of fish," by Shoji Konosu, Yoshiro Hashimoto, and Muzaffer Ozay, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 30, Nov. 1964, pp. 930-934, printed in Japanese and English. Japanese Society of Scientific Fisheries, Shiba-Kaigandori 6, Minato-ku, Tokyo, Japan.

ARGENTINA:

"La industria pesquera Argentina" (The fishing industry of Argentina), article, Pesca y Marina, vol. 17, no. 5, Oct.-Nov. 1965, pp. 4, 6-8, 10, illus., printed in Spanish. Fernando Flores Ltda., 705 N. Windsor Blvd., Los Angeles 38, Calif.

BONEFISH:

Bonefishing, by Stanley M. Babson, 128 pp., illus., printed, 1965, \$4.95. Harper and Row, Publishers, Inc., 49 East 33rd Street, New York 16, N. Y. The first complete book on catching bonefish. Tells where to find them, fishing techniques and tackle, selecting guides, and record catches. Offers solid advice and good reading for experienced fisherman and novice. Although bonefish are distributed in many parts of the world, at present Florida, the Caribbean, and the coastal waters off South America are the principal areas for fishing bonefish. The author describes studies at laboratories in Bimini (the Bahamas), the American Museum of Natural History, and the International Oceanographic Foundation at Miami. Presents the most up-to-date natural history of the bonefish. The book has an index.

BOTULISM:

"The botulism problem in seafoods," by Harold B. Allen, article, Proceedings of the Gulf and Caribbean Fisheries Institute, Seventeenth Annual Session, Nov. 1964, pp. 32-36, printed. Gulf and Caribbean Fisheries Institute, The Marine Laboratory, University of Miami, #1 Rickenbacker Causeway, Miami, Fla. 33149.

BRAZIL:

"Observações colhidas em nucleos pesqueiros de Alagoas, Sergipe e Bahia" (Observations on fishing centers in Alagoas, Sergipe and Bahia), by Bento F. Grangeiro, article, Boletim de Estudos de Pesca, vol. 3, no. 11/12, 1963, pp. 3-12, printed. Boletim de Estudos de Pesca, Rio de Janeiro, Brazil.

CALIFORNIA:

Ocean Sportfish Catch and Effort from Oregon to Point Arguello, California, July 1, 1957-June 30,

1961, by Daniel J. Miller and Daniel Gotshall, Fish Bulletin 130, 135 pp., illus., printed, 1965. Department of Fish and Game, The Resources Agency, Sacramento, Calif. 95814. (Sold by Office of Procurement, Documents Section, P. O. Box 1612, Sacramento, Calif. 95807.)

CANADA:

Fisheries Statistics, Quebec, 1963, 36 pp., illus., printed in French and English, October 1963, 75 Canadian cents. Queen's Printer and Controller of Stationery, Ottawa, Canada.

CASPIAN SEA:

On the Importance of the Herring-Gull in the Fishing of the Caspian Sea, by N. A. Gladkov and V. S. Zale-tayev, 11 pp., processed. (Translated from the Russian Voprosy Ikhtologii, no. 4, 1955, pp. 180-187, printed.) Zoological Museum, Moscow University, Moscow, U.S.S.R.

CEYLON:

The Marine and Fresh Water Fishes of Ceylon, by Ian S. R. Munro, 367 pp., 56 plates, illus., printed, 1955. Department of External Affairs, Canberra, Australia.

CHESAPEAKE BAY:

Chesapeake Science, vol. 6, no. 3, September 1965, pp. 125-140, illus., printed, single copy 75 cents. Natural Resources Institute, University of Maryland, Chesapeake Biological Laboratory, Solomons, Md. Includes, among others, these articles: "Sex Determination of Live Striped Bass *Roccus saxatilis* (Walbaum), by Biopsy Technique," by Douglas E. Ritchie; "Effect of Metallic Aluminum Particles on Oysters and Clams," by Robert W. Hanks; "Field Tests of Herbicide Toxicity to Certain Estuarine Animals," by Charles K. Rawls; "Larval Development of a Boring Clam, *Barnea truncata*," by Paul E. Chanley; and "Observations on Tag Loss and Comparative Mortality in Striped Bass," by Rupert R. Bonner, Jr.

CLAMS:

"Frozen clams offer potential if intelligently exploited," by Duane D. Shelton, article, Quick Frozen Foods, vol. 27, Feb. 1965, pp. 293-294, 297-299, printed. E. W. Williams Publications, Inc. 1776 Broadway, New York, N. Y. 10019.

COD:

"Effect of magnesium in salting of cod," by D. P. Sen and A. Aitken, article Journal of Food Science, vol. 30, Mar.-Apr. 1965, pp. 286-287, printed. Institute of Food Technologists, 510-522 No. Hickory St., Champaign, Ill. 61823.

"Polyphosphate treatment of frozen cod. 3--Taste panel evaluation, chemical assessment and thaw-drip in once-frozen Newfoundland trap-caught cod," by W. A. MacCallum, D. A. Chalker, and J. T. Lander, article, Journal of the Fisheries Research Board of Canada, vol. 21, Nov. 1964, pp. 1397-1402, printed. Queen's Printer and Controller of Stationery, Ottawa, Canada.

DEMERSAL FISH:

"Demersal fishes and fisheries of the northeastern Pacific Ocean," by A. T. Pruter, article, Transactions of the North American Wildlife and Natural Resources Conference, vol. 29, 1964, pp. 382-392, printed. Wildlife Management Institute, Wire Bldg., Washington, D. C. 20005.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

EELS:

"Export of eels big overseas earning potential," article, Commercial Fishing, vol. 4, no. 1, September 1965, pp. 7, 9, printed. Trade Publications Ltd., 26 Albert St., Auckland, New Zealand.

EXOTIC FISH:

The Book of Exotic Fish, by R. and M. L. Bauchot, 95 pp., illus., printed, 1964. Stein and Day (Publishers), 7 East 48th St., New York, N. Y. 10017.

EXPORTS:

Available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402:

"Exports by U. S. fisheries reach record, new data show," by J. M. Shea, article, International Commerce, vol. 71, no. 44, Nov. 1, 1965, p. 6, illus., printed, single copy 35 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C.

What You Should Know about Exporting--A How to Get Started Handbook, 46 pp., illus., printed, September 1965, 20 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. Informs the U. S. businessman on how to help himself and his Government expand exports to achieve a more favorable balance of payments position and to maintain high levels of employment and profits here at home while strengthening ties with friends and allies throughout the Free World. Discusses pinpointing markets, channels for trading, picking overseas partners, financing, insurance, regulations, handling orders, and promoting export sales. Presents a list of helpful pamphlets and articles on the subject.

FISH CULTURE:

Nutrition of Fish and Feedstuffs for Fish Culture, by Yoshiro Hashimoto and Tomotoshi Okaichi, No. 9, Parts I and II, 70 and 43 pp., respectively, illus., printed in Japanese. Japan Fisheries Conservation Association, Zenkoku Choson Kaikan Bldg., 1-17, Nagata-cho, Ciyoda-Ku, Tokyo, Japan.

FISH FARMING:

"Britain's first sea fish farm," by Robert Barton, article, Australian Fisheries Newsletter, vol. 24, no. 11, November 1965, pp. 29, 31, illus., printed. Fisheries Branch, Department of Primary Industry, Canberra, Australia.

The Fish Farmer, vol. 1, no. 1, November 1965, 11 pp., illus., printed. American Fish Farmers Federation, Lonsdale, Ark. (Available from The Fish Farmer, 1378 South Livermore Ave., Livermore, Calif. 94550.) The first issue of this periodical tells about the formation of the American Fish Farmers Federation, its functions and aims to help the fish farming business. A statement of aims and purposes tells what must be done in the future to build an industry. An article on legislation tells a little of what has been done in the past for the fish farmer. A list of fish dealers and haulers is included.

FISH MEAL:

"To compare the differences in growth rate and feed efficiency in chicks by replacing antibiotics plus

fish meal with that of poultry litter," by G. P. Agarwala, article, Indian Poultry Gazette vol. 48, no. 4, Jan. 1965, pp. 106-109, printed. Indian Veterinary Research Institute, Izatnagar, Up. India.

FISH PROTEIN CONCENTRATE:

"Supplementary value of a blend of cottonseed flour and fish flour on certain indigenous cereals," by S. S. M. Ali, A. Razzaq, and M. Jamil, article, Pakistan Journal of Scientific Research, vol. 16, no. 3/4, July-Oct. 1964, pp. 136-137, printed. Pakistan Association for the Advancement of Science, Lahore, Pakistan.

"Technological developments in the field of fish flour (Part VI), article, Balık ve Balıkçılık, vol. XIII, no. 9, September 1965, pp. 16-21, printed in Turkish. Balık ve Balıkçılık, Et ve Balık Kurumu G. M., Balıkçılık Mudurlugu, Besiktas, Istanbul, Turkey.

FISH SOLUBLES:

"Studies on fish-solubles. II--Nutritive value of commercial fish-solubles in rats and mice," by Toshio Onishi, Shigeo Murayama, and Takashi Kaneda, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 31, Jan. 1965, pp. 51-59, printed. Japanese Society of Scientific Fisheries, Shiba Kai-gandori 6, Minato-ku, Tokyo, Japan.

FLOUNDER:

"Growth studies of winter flounder, Pseudopleuronectes americanus (Walbaum), in Rhode Island," by Richard J. Berry, Saul B. Salla, and Donald B. Horton, article, Transactions of the American Fisheries Society, vol. 94, no. 3, 1965, pp. 259-264, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

FOOD AND AGRICULTURE ORGANIZATION:

Publications available free from the Fishery Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy:

Bulletin of Fishery Statistics, No. 4--Tunas, Bonitos, Skipjacks, 1937-38, 1947-63; 34 pp., processed in French, Spanish, and English, 1964.

Bulletin of Fishery Statistics, No. 5--Summaries: Catches and Landings, 1963, 37 pp., processed in French, Spanish, and English, 1964.

Bulletin of Fishery Statistics, No. 6--Catches in the North Atlantic, 1963, 73 pp., processed in French, Spanish, and English, 1965.

FRANCE:

"Nécessite d'une organisation valable des pêches européennes et extension des eaux réservées françaises à douze milles" (Need for a valid organization of European fisheries and extension of French territorial waters to twelve miles); "La productivité de la pêche française est inférieure à celle de la pêche allemande, mais l'écart est moins important qu'on le croit" (French fishery production is less than that of the German fishery, but the difference is less important than it is thought), by B. Albert Boyer, articles, La Pêche Maritime, vol. 44, no. 1050, Sept. 1965, pp. 657-658, 661-662, illus., printed in French, single copy 15 F (about US\$3). Les Editions Maritimes, 190, Blvd. Haussmann, Paris, France.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

"Ont inauguré la campagne de la 'marée du mardi'" ("Eat fish on Tuesday" promotion launched), by Jean Morin and Jacques Huret, article, *La Pêche Maritime*, vol. 44, no. 1051, October 1965, pp. 737-738, illus., printed in French, single copy 15 F. (US\$2.85). *La Pêche Maritime*, 190 Boulevard Haussmann, Paris 8e, France.

Science et Pêche, no. 139, July-Aug. 1965, 20 pp., illus., printed in French, single copy .50 F. (about 10 U.S. cents). L'Institut Scientifique et Technique des Pêches Maritimes, 59 Avenue Raymond-Poincaré, Paris (16e), France. Articles included are: "Étude des fonds de pêche des Îles Baléares, campagne de l' (Ichthys), Avril-Mai 1965" (Study of fishing depths off the Balearic Islands. Ichthys cruise--April-May 1965), by Cl. Maurin and H. Scoffoni; "Essais préliminaires de pêche des anchois à la lumière dans le Golfe de Gascogne" (Preliminary fishing tests with lights in the Gulf of Gascony), by Georges Kurc; and "La campagne harenguière 1964-65 dans le pas-de-calais et l'évolution récente du stock de harengs dans cette région" (The 1964/65 herring season in the Straits of Dover and the recent status of the stock of herring in that region), by Alain Maucorps.

Selling in France, by Alexander Dauman, OBR 65-73, 18 pp., printed, October 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

FRESHNESS TESTS:

Testing the Freshness of Frozen Fish (A review of biochemical indices of quality in fish, with special reference to frozen products), by Edith Gould, 51 pp., printed, 17s. 6d. (about US\$2.75). Fishing News (Books) Ltd., 110 Fleet Street, London, EC4, England. "Over the past quarter-century," states the author, "many attempts have been made to establish a reliable test for the degree of freshness in frozen fishery products. As yet, no objective test has been discovered that correlates satisfactorily with the subjective taste panel method." The author points out that papers commenting on one or more of the many existing tests are published each year. Because of the diversity in experimental conditions and specimens and because of differing reports in the literature, periodic reviews are almost mandatory, in order that the fishery scientist may avoid fruitless lines of experimentation and may determine the more promising directions for his own research. The primary purpose of this paper is to catalogue the objective tests in the literature, with an eye to their use for frozen fishery products. A secondary purpose is to indicate likely starting places from which to proceed in the search for an index. Necessarily, occasional brief mention is made of the biochemical background, an indispensable adjunct to the research itself. In presenting the development of existing indices, the author groups existing tests into these arbitrary classifications: bases, acids, sugars, lipides, nucleotides, proteins, enzymes, and miscellaneous. The enzymes are considered separately from the other proteins. The analytical listing of past research in this book meets a long-felt need. Besides considering and cataloging the existing tests (principally for

fresh or iced fish), varying shades of informed opinion are reported and each test is weighed for possible use with frozen fish.

GEAR:

Modern Fishing Gear of the World 2, 619 pp., illus., printed in English and French with French, Spanish and English abstracts, June 1964, £ 6 15s. (about US\$18.85). Fishing News (Books) Ltd., Ludgate House, 110 Fleet St., London EC4, England. Contains papers presented at the World Congress on Fishing Gear organized by the Food and Agriculture Organization of the United Nations, held at London, May 25-30, 1963. The discussions arising from the papers were recorded, edited, and are also included. The more than 80 papers are grouped in three parts. Part I--materials for nets and ropes--comprises four sections in which are given 18 papers, including those on terminology and standardization of numbering systems; test methods for fishing gear materials, nets, and twines; new net materials and knotless nets and monofilaments. Part II deals with bulk fish catching, and its eight sections cover stern trawling, bottom trawling, midwater trawling, gill-netting, long-lining and traps, purse-seining, deck machinery, fish detection, and fleet operations. Part III--technical research in four sections, comprising 20 papers--deals with gear research, instruments for testing gear, fish behavior in relation to nets, trawls, and mechanical stimuli, electrical fishing, and science and the future. A detailed index completes the book. It will be a valuable addition to the library of the commercial fisherman, an excellent reference for those engaged in exploratory fishing and gear research, and good background for fishing vessel owners and others interested in fisheries.

GERMAN FEDERAL REPUBLIC:

Berichte der Deutschen Wissenschaftlichen Kommission für Meeresforschung, new series, vol. 18, no. 1, 1965, 109 pp., illus., printed in German with summaries in English and Spanish. DM 44.60 (about US\$11.25). Verlag Paul Parey, Spitalerstrasse 12, 2 Hamburg 1, German Federal Republic. Contains, among others, these articles: "Der Beifang in den Fangen der deutschen Garnelenfischerei in den Jahren 1954-60" (Incidental catches in the German shrimp fishery 1954-60), by Von P. F. Meyer-Waarden and K. Tiewis; "Über die Verbreitung der Fischbrut in der Südlischen Nordsee und im östlichen Englischen Kanal im Winter" (On the diffusion of fish fry (spawn) in the southern North Sea and eastern English Channel in Winter), by Von I. K. Oray.

GROUND FISH:

Serial Atlas of the Marine Environment--Autumn Distribution of Groundfish Species in the Gulf of Maine and Adjacent Waters, 1955-1961, by Raymond L. Fritz, Folio 10, illus., printed, 1965, looseleaf \$5, bound \$8. Serial Atlas of the Marine Environment, American Geographical Society, Broadway at 156th St., New York, N. Y. 10032.

GULF OF MEXICO:

"Length-weight relationships of some Gulf of Mexico fishes," by C. E. Dawson, article, *Transactions of the American Fisheries Society*, vol. 94, no. 3, 1965, pp. 279-280, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

HADDOCK:

"Seasonal food habits of Highlands Ground haddock," by Roland L. Wigley, article, *Transactions of the American Fisheries Society*, vol. 94, no. 3, 1965, pp. 243-251, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

HAKE:

"Conditioning of Hake Processing Effluents, by S. G. Wiechers, and others, Progress Report No. 83, 9 pp., processed, July 1965. Fishing Industry Research Institute, University of Cape Town, Rondebosch, Cape Province, South Africa Republic.

HANDLING AND PROCESSING:

"The Technology of Fish Utilization (Contributions from Research), edited by Rudolf Kreuzer, 302 pp., illus., printed, 1965, £5 5s. (about US\$14.70). Fishing News (Books) Ltd., Ludgate House, 110 Fleet St., London EC4, England. A most comprehensive, stimulating, and valuable book for scientists and operators engaged in the handling and processing of fish. In May 1964 about 100 scientists and technologists held a symposium ("On the Significance of Fundamental Research in the Utilization of Fish") at Husum, Federal Republic of Germany, under the auspices of the Fisheries Division, FAO. This book is a collection of the 60 papers presented by scientists at that meeting under six principal subjects: rigor mortis in fish; problems related to the preservation of fresh fish; control of deteriorative changes in frozen fish; measuring the degree of freshness of fish; production and storage of fish protein concentrate; and dehydration and canning of fish. Also reported are the discussions that followed the presentation of the papers under a particular subject. This resulted in a survey of (1) what is required to solve the problems discussed and (2) what so far has been done about them. The book concludes with summaries from the viewpoint of (1) industry, (2) applied research, and (3) fundamental research. Contains an adequate index.

HERRING:

"A new genus and subgenus of clupeid fishes and notes on the genera Clupea, Sprattus and Clupeonella," by P.J.P. Whitehead, article, *Annals and Magazine of Natural History*, vol. 7, no. 78, 1964, pp. 321-330, illus., printed. Taylor & Francis Ltd., Red Lion Court, Fleet St., London EC4, England.

"A tag for young herring," by John E. Watson, article, *Underwater Naturalist*, vol. 2, no. 2, 1964, pp. 6-8, illus., printed. American Littoral Society, Sandy Hook Marine Laboratory, Highlands, N. J.

"A technique for mounting and storing herring otoliths," by John E. Watson, article, *Transactions of the American Fisheries Society*, vol. 94, no. 3, 1965, pp. 267-268, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

INDIA:

"A new element in the commercial fishery of Chilka Lake," by A. V. Natarajan and K. L. Shah, article, *Science and Culture*, vol. 29, no. 10, 1963, pp. 513-514, illus., printed. Indian Science News Association, 92 Upper Circular Rd., Calcutta 9, India.

Articles from *Indian Fisheries Bulletin*, vol. X, printed, Re. 1 (about 21 U.S. cents) per issue. Department of Food, Ministry of Food and Agriculture, New Delhi, India:

No. 1, January 1963--"Development of Indian fisheries during the year 1962-63"; "Progress of INP for the year 1961-62"; "Exploratory and experimental fishing"; and "From research laboratories"; pp. 1-14.

No. 2, April 1963--"A preliminary report on the exploratory fishing operations in the Gulf of Mannar (1959-1961)"; "Review of the progress of work of Indo-Norwegian Project during the year 1962-63"; "Mark-recovery experiments and techniques of marking shrimps"; "From research laboratories"; and "Exploratory and experimental fishing"; pp. 1-27, 32-38.

INDUSTRIAL PRODUCTS:

"El dosaje de calcio y de fosforo en harinas y solubles de pescado" (The amount of calcium and phosphorus in fish meals and fish solubles), by Johann Firbas and Giulio Vaccari, article, *Boletim de la Sociedad Quimica del Peru*, vol. 30, no. 3, 1964, pp. 93-97, printed. Sociedad Quimica del Peru, Casilla 891, Lima, Peru.

Fisheries By-Products, 1950-1963, by R. G. Ackman and P. M. Jangaard, New Series Circular No. 19, Sept. 3, 1964, 7 pp., printed. Fisheries Research Board of Canada, Technological Research Laboratory, Halifax, Nova Scotia, Canada.

INTERNATIONAL COMMISSIONS:

International Commission for the Northwest Atlantic Fisheries, Research Bulletin 2, 82 pp., illus., printed, 1965. International Commission for the Northwest Atlantic Fisheries, Bedford Institute of Oceanography, P. O. Box 638, Dartmouth, N. S., Canada.

IRRADIATION PRESERVATION:

"Acceptability of irradiated fish and shellfish," by Nancy Stoll and David Miyauchi, article, *Journal of the American Dietetic Association*, vol. 46, Feb. 1965, pp. 111-115, printed. American Dietetic Association (Nutrition), 620 N. Michigan Ave., Chicago 11, Ill.

ITALY:

Bollettino di Pesca, Piscicoltura e Idrobiologia, vol. 40, no. 19, July-December 1964, pp. 199-298, illus., printed in Italian with French and English summaries, single copy L. 800 (about US\$1.30). Laboratorio Centrale di Idrobiologia, Piazza Borghese, 91, Rome, Italy. Some of the articles are: "Su alcuni caratteri chimici dei mitili (*Mytilus galloprovincialis* Lamarck) coltivati nel Mar Piccolo e nel Mar Grande (Golfo di Taranto) (On some chemical characteristics of the mussel (*Mytilus galloprovincialis* Lamarck) cultivated in the Small Sea and Big Sea (Gulf of Taranto), by Angelo Strusi; "Contributo allo studio della morfologia e della biologia della Sardina della Manica" (Contribution on the study of morphology and biology of the English Channel sardine), by Francesco Matta; "Marine electrical fishing," by Sergiu Schapira; "Studi sulla biologia e pesca di *Xiphias gladius* L." (Study on the biology of the swordfish (*Xiphias gladius* L.), by Antonino Cavaliere; and "La mitilicoltura nello Stagno di Thau" (Mussel culture of the Thau estuary), by Francesco Matta.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

IVORY COAST:

"La Côte d'Ivoire, qui a reçu en 1964 53,000 t de poisson de pêche locale, a d'importants projets de développement de son industrie de la pêche" (The Ivory Coast, which has landed 53,000 metric tons of fish from the domestic fishery in 1964, has some important development projects in its fishing industry), article, *La Pêche Maritime*, vol. 44, no. 1050, Sept. 1965, pp. 666-668, illus., printed in French, single copy 15 F. (about US\$3). Les Editions Maritimes, 190, Blvd. Haussmann, Paris, France.

JAPAN:

On the Reclamation Work and the Countermeasures for Occupational Change of Fishermen in Oita Sea-side Industrial Area, by Hajimu Tanaka, No. 5, 38 pp., illus., printed in Japanese. Japan Fisheries Conservation Association, Zenkoku Choson Kaikan Bldg., 1-17, Nagata-Cho, Ciyoda-ku, Tokyo, Japan.

KENYA:

Basic Data on the Economy of Kenya, by Robert L. Ware, Jr., OBR 65-75, 16 pp., printed, November 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

LOUISIANA:

"Effects of hurricane 'Betsy' on Louisiana's seafood industry," by Lyle S. St. Amant, article, *Louisiana Conservationist*, vol. 17, nos. 11 & 12, Nov.-Dec. 1965, pp. 5-7, 21, illus., printed. Louisiana Conservationist, Wild Life & Fisheries Bldg., 400 Royal St., New Orleans, La. 70130.

MARINE MAMMALS:

Marine Mammals of California, by Anita E. Daugherty, 87 pp., illus., printed, 1965. Department of Fish and Game, Resources Bldg., 1416 9th St., Sacramento, Calif. 95814. The introduction discusses the economic worth of marine mammals and their value to biologists. Succeeding chapters cover modification of marine mammals; whales and dolphins (Cetacea); sea lions, fur seals, hair seals, and walruses (Pinnipedia); the sea lion controversy; Cetacean; tooth counts; meanings of scientific names, and marine mammal checklist. The species described, with accompanying drawings and photos, include the Pacific right, little piked, sei, blue, finback, humpback, gray, pilot, killer, sperm, pygmy sperm, Baird's beaked, and Cuvier's beaked whales; common, Risso's, striped, right whale, spotted, long-beaked, rough-toothed, and bottlenose dolphins; the harbor and Dall porpoises; Guadalupe fur, northern fur, ribbon, elephant, and harbor seals; stellar and California sea lions; and the sea otter.

MARINE OIL:

"Spectrophotometric studies on shark liver oil from the Red Sea," by M. K. Salah and M. M. Abdallah, article, *Chemical Abstracts*, vol. 62, April 12, 1965, Abstract No. 9363d, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

MARINE RESOURCES:

Marine Resources of the Atlantic Coast (a new series of leaflets designed to present up-to-date research findings and scientific knowledge of marine species

taken in commercial and sport fisheries along the Atlantic Coast), 4 pp. each, illus., printed, October 1965. Atlantic States Marine Fisheries Commission, 336 East College Ave., Tallahassee, Fla. 32301:

Leaflet No. 1--Introducing a Marine Resources Leaflet Series.

Leaflet No. 2--Atlantic Menhaden--A Most Abundant Fish.

Leaflet No. 3--The Soft-Shell Clam--A Resource with Great Potential.

Leaflet No. 4--Southern Shrimp--A Valuable Regional Resource.

MARKETING:

"A better way of marketing fish," by E. A. Ruthford, article, *Quick Frozen Foods*, vol. 27, Feb. 1965, pp. 148-149, printed. E. W. Williams Publications, Inc., 1776 Broadway, New York, N. Y. 10019.

MEXICO:

Establishing a Business in Mexico, by Katherine E. Rice, OBR 65-71, 20 pp., printed. October 1965, 15 cents. U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) A report to assist businessmen interested in establishing an enterprise in Mexico. A generally accepted principle is that foreigners have the right to invest in Mexico and to withdraw the profits and proceeds provided they do so in accordance with Mexican laws. In addition to investment policy, the report discusses entrance and rights of aliens, business organization law, and taxation regulations. It also covers licensing agreements; patents, trademarks, and copyrights; labor legislation; and United States taxation of income earned in Mexico.

MISSISSIPPI RIVER:

"Movement of walleye and sauger in the upper Mississippi River," by Roger Schoumacker, article, *Transactions of the American Fisheries Society*, vol. 94, no. 3, 1965, pp. 270-271, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

NORWAY:

"Forsøksfiske etter blåkvete utenfor Lofoten og Helgeland" (Exploratory fishing for Greenland halibut off Lofoten and Helgeland), by O. Chr. Jenssen, article, *Fiskets Gang*, vol. 51, no. 39, Sept. 30, 1965, pp. 584-585, illus., printed. Fiskets Gang, Fiskeridirektoratet, Radstuplass 10, Bergen, Norway.

Articles from *Fiskets Gang*, vol. 51, 1965, printed in Norwegian. Fiskets Gang, Fiskeridirektoratet, Radstuplass 10, Bergen, Norway:

"Fiskeflåten 1963 og 1964" (Fishing Fleet, 1963 and 1964), no. 41, Oct. 14, 1965, pp. 609-613.

"Tøkt med G. O. Sars til Nord-Norge, 22 Juli-14 August 1965" (G. O. Sars cruise to North Norway, July 21 to August 14, 1965), by Finn Devold, no. 41, Oct. 14, 1965, pp. 614-616, illus. Purpose of cruise was to learn more about distribution of herring and oceanographic materials.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

"Fiskeforsøk etter sjøkreps 1964" (Exploratory fishing for Norway lobsters 1964), by Birger Rasmussen, no. 42, Oct. 14, 1965, pp. 629-631, illus. Pertains to *Nephrops norvegicus*, also known as scampi and Dublin prawn.

Articles from *Norsk Fiskerinaering*, vol. 5, no. 3, 1965, printed in Norwegian. Norsk Fiskerinaering, Maltrostveien 16B, Oslo, Norway:

"Sentralisert eller fri eksport av fisk og fiskevarer?" (Centralized or free export of fish and fish commodities?), pp. 35, 37, 39, 41-42.

"Foran en forhøyet lysere tid i fiskerinaeringen haster det med å få en hensiktsmessig skatteordning!" (Before a hoped for brighter time in the fishery business we must hasten to acquire an appropriate tax adjustment!), pp. 45, 47.

"Utviklingen på arbeidsmarkedet i årene 1956 til 1964" (Development in the labor market in the years 1956 to 1964), pp. 61, 63.

OCEANOGRAPHY:

Deep-Sea Research, vol. 12, no. 1, Feb. 1965, 114 pp., illus., printed. Pergamon Press Ltd., 122 E. 55th St., New York, N. Y. 10022. Two of the articles are: "Synthetic-fiber deep-sea mooring cables: Their life expectancy and susceptibility to biological attack," by P. B. Stimson; and "A mass fish mortality on the Somali Coast," by P. Foxton.

Instrumented Telemetering Deep Sea Buoys, by H. W. Straub and others, Technical Bulletin No. 26, 26 pp., printed, June 1965, 25 cents. Coast and Geodetic Survey, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

New Worlds of Oceanography (Man's New Explorations into the Mysterious, Living Sea), by Captain E. John Long, USNR (ret.), preface by Senator Warren G. Magnuson, 221 pp., illus., printed, 1965, \$0.75. Pyramid Publications, Inc., 444 Madison Ave., New York, N. Y. 10022. Man knows more about space than he does about the sea, but in order to increase man's knowledge of the ocean depths, more and more books are being issued. A summary of man's knowledge of the sea and a fascinating exploration into tomorrow's knowledge of the wealth of the sea is contained in this little book. It documents America's billion-dollar development of the ocean's treasure and its limitless supply of natural resources in the years to come. It points out how a cubic mile of sea water containing 18 million tons of magnesium and 25 tons of gold can be mined; the existence of a new deep underwater treasure worth countless billions of dollars; how enough drinking water from the sea can be desalted to serve the needs of every person in the world a thousand times over; and the use of "oceanic engineering" to obtain more of the fishery resources of the sea. The chapters deal with the realm of "living fossils"; man and the sea; currents, waves, and the like; the living waters--fishes and mammals; the bottom--and lower; most precious mineral--and others; poisoning the sea; birthplace of storms; making fisheries pay; gadgets and hardware; oceanic defense problems;

and a glimpse into the future. Senator Magnuson in his preface states: "... This is where Captain Long's book has particular value. His Chapter headings... should stimulate many to greater interest in the oceans." The book is adequately indexed.

--Joseph Pileggi

Oceanographic Observations in the Indian Ocean in 1963, H. M. A. S. GASCOYNE (Cruise G1763), Oceanographical Cruise Report No. 21, 136 pp., illus., processed, 1965. Division of Fisheries and Oceanography, Commonwealth Scientific and Industrial Research Organization, Melbourne, Australia.

Ocean Science and Ocean Engineering, 1965, vol. 1, pp. 1-656 + xiv; and vol. 2, pp. 657-1349 + xiv; illus., printed, 1965, \$4.00 each. Marine Technology Society, Executive Building No. 828, Washington, D. C. 20005. These two volumes contain papers presented at the Ocean Science and Ocean Engineering Conference held under the joint sponsorship of the Marine Technology Society and the American Society of Limnology and Oceanography, in Washington, D. C., June 14-17, 1965. Their purpose is to disseminate knowledge of the marine sciences to the membership of sponsoring societies and to the scientific community at large. Papers of each conference session are grouped together and are arranged in the chronological order of the several conference sessions. A new order of cooperation between government (both national and state), industry, science, and labor will be required if the oceans of the world are to be understood and intelligently used for the benefit of mankind. The world has been working for the past few years on a concentrated program in oceanography to study the dynamics of ocean behavior on and beneath the surface, to map the depths and shorelines with much greater accuracy and to assess the vast storehouse of food, minerals, and chemicals for future exploitation by mankind. The papers range from "Petroleum's Pandora" to "The Vertical Distribution of Phytoplankton in Tropical Waters." A few of the papers of particular interest to fisheries include: "Ocean Engineering and Oceanography--From the Businessman's Viewpoint"; "Ocean Engineering--Its Application to the Harvest of Living Resources"; "A Submarine for Research in Fisheries and Oceanography"; "An Improved Depth Telemetry System for Fishing Gear Experiments"; "An Unmanned Research Vehicle for Use Down to Mid-Ocean Depths"; "Oceanic Information--Its Collection and Dissemination." The numerous papers cover a wide gamut of interest and serve to review the present status of ocean science and engineering.

Ocean Sciences, edited by E. John Long, 302 pp., illus., printed, 1964, \$10. United States Naval Institute, Annapolis, Md. The sea and man's centuries of work and warfare on it have resulted in many books, but it is only in recent years that books on the resources of the sea have been issued. One of the most promising ways of meeting the needs of our exploding world population is to extend our range to include the three-quarters of the earth which is covered by water, and tap the riches which lie in and under it. Here is a round-table discussion of the highly individual but closely related sciences which contribute to the overall knowledge of the oceans, their physical properties,

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and how to utilize them. This book fills the gap between popular literature and technical writing on the subject of oceanography. The book is a series of articles by scientists and naval officers discussing in nontechnical language the major disciplines and fields of interest of oceanography today. Chapters cover the history of oceanography, physical properties, military oceanography, meteorology and climatology, charts and maps, polar oceanography, marine biology, atomic and other wastes in the sea, instrumentation and underwater vehicles, marine geology, National Academy of Sciences-National Research Council Committee on Oceanography, oceanography and government, fisheries and oceanography, and oceanography's future. A desirable feature are the appendices which list and describe the oceanographic research institutions around the world; present data on oceanographic ships of the world by institute and country; and include some conversion tables. Also included is a glossary of oceanographic terms, a bibliography, and an index. This will be a valuable addition to any fishery or marine library, and a desirable desk reference for the marine scientist. The layman will find many tidbits of information about our watery world.

--Joseph Pileggi

Processing Oceanographic Station Data Using Rapid Data-Handling Equipment, TM No. 284, 40 pp., illus., processed, August 1962. U. S. Naval Underwater Ordnance Station, Newport, R. I.

Serial Atlas of the Marine Environment--Inorganic Nutrients in the North Sea, by Robert Johnston and Peter G. W. Jones, Folio 11, illus., printed, 1965, looseleaf \$4.50, bound \$7.50. Serial Atlas of the Marine Environment, American Geographical Society, Broadway at 156th St., New York, N. Y. 10032.

PAKISTAN:

Establishing a Business in Pakistan, by Larry A. Niksch, OBR 65-72, 13 pp., printed, October 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402.) A report summarizing the major legal requirements for establishing a business and investing in Pakistan. It outlines the pertinent sections of Pakistan's laws, regulations, and policies affecting the establishment and operation of business enterprises in Pakistan by foreign nationals. Attention also has been given to the factors governing foreign participation in joint ventures with Pakistan nationals.

PEARLS:

"Pearl expert sees rich future for Pacific's 'white gold'," article, Pacific Islands Monthly, vol. 36, no. 9, Sept. 1965, p. 61, illus., printed, single copy 60 U. S. cents. Pacific Publications Pty. Ltd., 29 Albert St. (Box 3408, G.P.O.), Sydney, Australia. Refers to the cultured pearl industry.

POISONOUS FISH:

Poisoning by Barracuda and Other Fishes, by Donald De Sylva, Special Service Bulletin No. 13, 8 pp., Aug. 1956, printed. The Marine Laboratory, University of Miami, #1 Rickenbacker Causeway, Miami Fla. 33149.

POLAND:

Faculty of Fisheries, Agricultural University of Warmia and Mazury in Olsztyn, 19 pp., printed, 1965. Wydział Rybacki, Warmińsko-Mazurskiej Akademii Rolniczej (The Faculty of Fisheries, Agricultural University of Warmia and Mazury), Olsztyn, Poland. A prospectus of the Faculty of Fisheries which outlines in detail its educational and research aims in the study of oceanography, marine biology, limnology, ichthyology, and fish culture. It also describes the Faculty's work on technology of fish processing, fishery microbiology, and fishery economics.

POND FISH:

"Demand growing for pond-raised commercially-fed fish says biologist," article, Feedstuffs, vol. 37, Mar. 13, 1965, p. 8, printed. Miller Publishing Co., 2501 Wayzata Blvd., Minneapolis, Minn.

PUERTO RICO:

Institute of Marine Biology, University of Puerto Rico, Contributions, vol. 4, Oct. 1962-Dec. 1963, 64 reprints of articles, printed. Institute of Marine Biology, University of Puerto Rico, Mayaguez, Puerto Rico. Some of the reprints are: "Methods of collecting small fishes," by John E. Randall, contribution no. 45 (reprinted from Underwater Naturalist, vol. 1, no. 2, Feb. 1963, pp. 6-11, 32-36); "Institute of Marine Biology, University of Puerto Rico," by John E. Randall, contribution no. 57 (reprinted from American Zoologist, vol. 3, no. 3, Aug. 1963, pp. 303-304); "Dangerous sharks of the Western Atlantic," by John E. Randall, contribution no. 62, (reprinted from Sharks and Survival, chapter 11, pp. 339-361, 1963); "Report of the West African Fisheries Survey. . . Gulf of Guinea," by Gilbert W. Bane, Jr., contribution no. 64, (reprinted from Starkist Foods, Inc. Special Report, Aug. 1960, 63 pp.).

RED SEA:

"A Review of the Elopoid and Clupeoid Fishes of the Red Sea and Adjacent Regions," by P. J. P. Whitehead, Bulletin of the British Museum of Zoology, vol. 12, no. 7, 1965, 57 pp., illus., printed, 19s. (about US\$2.70). British Museum (Natural History), Cromwell Rd., London SW7, England.

RESOURCE MANAGEMENT:

The Fisheries Problems in Resource Management, edited by James A. Crutchfield, 152 pp., illus., printed, 1965, \$5.00. University of Washington Press, Seattle, Wash. 98105. The first volume of studies on Public Policy Issues in Resource Management based on a series of seminars sponsored by the Graduate School of Public Affairs of the University of Washington. With the increasing interest in the resources of the seas, the question of the proper management of those resources becomes important. All of the key issues of natural resources public policy are found in the fisheries resource: the concept of the public interest, including both economic and social values; the conservation issue; the question of technical expertise versus lay judgment; the problem of competing governmental jurisdictions. The interdisciplinary approach in dealing with such problems is brought out in the three parts that make up this book. The physical setting of the fishing industry and the complex dynamics of the regulation of fishery populations are covered in "Part I: Conservation of the Resource." The relation of the economic motiva-

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tions of the commercial fisheries to the physical characteristics, and the resulting administrative problems are examined in "Part II: Economics and Administration." The various objectives and techniques of fishery conservation from the point of view of constitutional and international law are brought out in "Part III: Fishery Law." The whole presentation is a series of papers and commentary on public policy issues involved in the management of fishery resources and presented at the inaugural series of Natural Resources Public Policy Seminar sponsored by the Graduate School of Public Affairs. Selected references are included. This book should be of value to administrators and social scientists, commercial and sport fishermen, dealers in fishery products, biologists, consultants, researchers, and others interested in the resources of the seas.

--Joseph Pileggi

SALMON:

Atlantic Salmon Journal, Fall 1965, 38 pp., illus., printed. Atlantic Salmon Association, 1559 McGreggor St., Montreal 25, Canada. Contains, among others, articles on: "Salmon and sea trout hybrids," by D. J. Piggins; "Quebec's research on a new type of fishway for salmon"; "The survival of Pacific Salmon in the Atlantic"; "The Greenland salmon fishery"; "Preliminary report on recaptures in Greenland waters of salmon tagged in rivers of America and Europe," by Paul M. Hansen; "The Sea and Salmo salar," by T. B. Fraser; "Canadian Atlantic salmon recaptured near Greenland"; and "Greenland fishing of Atlantic salmon."

Salmon of the North Pacific Ocean, Part V, Offshore Distribution of Salmon, by J. I. Manzer and others, Bulletin No. 14, 455 pp., illus., printed, 1965. International North Pacific Fisheries Commission, 6640 NW Marine Dr., Vancouver 8, B. C., Canada. A description of the offshore distribution of salmon as determined from information obtained from research vessel operations and records of commercial fishing vessels.

Articles from Pacific Marine Fisheries Commission Bulletin, No. 6, 1963, printed. Pacific Marine Fisheries Commission, 741 State Office Bldg., 1400 S.W. 5th Ave., Portland 1, Oreg.:

"Availability of small salmon off the Columbia River," by H. Heyamoto, pp. 81-88.

"Statistical methods for estimating California salmon landings," by Norman J. Abramson and Paul T. Jensen, pp. 61-2.

SARDINES:

"O fabrico das conservas de sardinha do Mediterraneo em Tunes" (Canning of Mediterranean sardines in Tunisia), article, Conservas de Peixe, vol. 20, no. 234, September 1965, pp. 15, 17, 19-20, 32, printed in Portuguese. Sociedade da Revista Conservas de Peixe, Lda., Requeirao dos Anjos, 68, Lisbon, Portugal.

SEAWEED:

"Estudios sobre algas realizados en las costas españolas" (Studies on seaweeds from the Spanish

coasts), by Manuel Lopez Benito, article, Industria Conservera, vol. 31, no. 312, June 1965, pp. 157-158, illus., printed in Spanish. Industria Conservera, Calle Marques de Valladarea, 41, Vigo, Spain.

SHARKS:

About Sharks and Shark Attack, by David H. Davies, 237 pp., illus., printed, 1964. Shuter & Shooter, Pietermaritzburg, Natal, South Africa Republic.

Sharks and Survival, edited by Perry W. Gilbert, 582 pp., illus., printed, 1963, \$9.95. D. C. Heath & Co., 285 Columbus Ave., Boston 16, Mass. "Man eaters" and sharks are synonymous to many people. Some of the larger and more active species have earned this reputation. But of 250 species of sharks widely distributed throughout the oceans of the world, only a few are dangerous to man. The great majority either are so small, so sluggish, and so weakly armed, or normally feed on such small prey that they are no menace to man. Yet those few that are dangerous to man have created a real hazard to men of the sea. There are a number of species that are a menace to man in amphibious operations, under conditions of emergency survival at sea, to divers, or to bathers on the beaches. Although there have been extensive studies on the sharks of the western North Atlantic, there are still wide gaps in our knowledge on their distribution, seasonal migrations, feeding habits, physiology of even the better known species, and the relationships between the species. This book concentrates on the known habits and regional distribution of the sharks that are known to be especially dangerous in different parts of the world, but it also reviews the sensory equipment of sharks that influences and directs their predatory activities. A substantial portion of the book is devoted to the shark-hazard problem and to a review of the various precautions man may take to increase his chances of survival in shark-infested waters. The book is an outgrowth of a Conference on the Basic Research Approaches to the Development of Shark Repellents, sponsored by the AIBS and Tulane University and supported by the Office of Naval Research and the Navy Bureau of Aeronautics. Consisting of six sections, the book is made up of chapters by contributors who are experts in their field. Section I on taxonomy and distribution is a guide to the kinds of potentially dangerous sharks. Section II on behavior of sharks presents field notes and field observations, sharks in captivity, and facilities for experimental investigation of sharks. Section III on the nervous system and sense organs of sharks discusses the central nervous system, hearing, olfaction, gustation, and visual apparatus. Section IV concentrates on dangerous sharks and devotes chapters to shark attacks in Australia, dangerous species of the Western Atlantic, shark attacks in South African seas, and open-ocean shark attacks. Section V presents patterns of shark attack for the world. Section VI concentrates on the shark-hazard problem and there are chapters on attacks by sharks as related to the activities of man; specifications for a shark repellent; development of the U. S. Navy "Shark Chaser" chemical shark repellent; anti-shark measures; testing shark repellents; first-aid treatment of shark bites; advice to those who frequent or find themselves in shark-infested waters; and the AIBS shark research panel. The appendix is a most complete resume of

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shark attacks ever assembled, together with an analysis of environmental factors that may provoke sharks to attack man. Besides a good general index, the book has an index to scientific names of sharks. This book will answer many questions about sharks and will be of interest to researchers, fishermen, vessel owners, and all those interested in the sea.

--Joseph Pilleggi

SHELLFISH:

National Shellfish Sanitation Program Manual of Operations, Part II--Sanitation of the Harvesting and Processing of Shellfish, Public Health Service Publication No. 33, 62 pp., illus., processed, 1965 revision, 55 cents. Public Health Service, U. S. Department of Health, Education, and Welfare, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

SHRIMP:

"On the introduction of an edible oriental shrimp (Caridea, Palaemonidae) to San Francisco Bay," by W. A. Newman, article, Crustaceana, vol. 5, no. 2, 1963, pp. 119-132, printed. Florida Board of Conservation, Marine Laboratory, St. Petersburg, Fla.

"Prawn resources of Southern Maharashtra (Ratnagiri)--an outlook for a new industry," by M. R. Ranade and S. M. Wankar, article, Current Affairs Bulletin, no. 43, August 1965, pp. 6-10, processed. Indo-Pacific Fisheries Council, Food and Agriculture Organization of the United Nations, Bangkok, Thailand. A brief review of the origin and growth of the shrimp fishery of Southern Maharashtra, together with some observations on the catches as a result of the exploratory survey. Discusses the potential as a fishery.

"Shrimp nursery--Science explores new ways to farm the sea," by Clarence P. Idyll, article, National Geographic, vol. 127, no. 5, May 1965, pp. 636-659, illus., printed. National Geographic Society, 17th and M Sts. NW., Washington, D. C. 20036.

SMALL BUSINESS:

A Survey of Federal Government Publications of Interest to Small Business--2nd Edition, compiled by Elizabeth G. Janzecek, 126 pp., printed, 1965, 45 cents. Small Business Administration, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

SMOKING:

Controlled Smoking of Hake, by G. M. Dreosti and A. Empedocles, Progress Report No. 84, 3 pp., processed, July 1965. Fishing Industry Research Institute, University of Cape Town, Rondebosch, Cape Province, South Africa Republic.

SOUNDS IN THE SEA:

Review of Marine Bio-Acoustics (State of the Art: 1964), AD 619 283N, by William N. Tavolga, 55 pp., illus., photostat, February 1965, \$4. Clearinghouse for Federal Scientific and Technical Information, Springfield, Va. 22151. The available information and literature on marine animal sounds is surveyed, reviewed, and evaluated. A brief historical review

lists some of the major contributions to the field from the early 19th century to date, and a general non-technical survey covers the contribution of marine animals to ambient sea noise and the sounds of marine invertebrates, fishes, and cetaceans. A detailed technical review summarizes and evaluates the literature on: mechanisms of sound production in marine animals, including a discussion on the physics of swim bladders as acoustic transducers; the acoustical characteristics of marine animal sounds; auditory capacities of marine animals; and the biological and behavioral significance of marine animal sounds. The problems of identification and classification of unknown sound sources are discussed. Examples of sonic mechanisms and spectrograms of the sounds are illustrated.

SOUTH AFRICA:

S. A.'s Sea Wealth (Cape Times Annual Review of the Fishing Industry), by Clive Algar, 20 pp., illus., printed, Oct. 28, 1965. Central News Agency Limited, 130 Bree St., Cape Town, South Africa Republic. (Available from The Cape Times Limited, Burg St., Cape Town, South Africa Republic.) Articles included are: "Anchovies help inshore fishing"; "Shrimp and prawn possibilities"; "Cape catches 1,500 whales"; "Boost to rock lobster industry"; "S. A. fish meal is world's choice"; "R5m. spent on new trawlers"; "SWA's big share of shoal catch"; "Plans for harbour development"; "Big-game fishing is popular"; and "All pilchard boats built locally."

SPAIN:

Export Market Guide to Spain, 4 pp., printed, 1965, 10 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C., 20230.

"Técnica conservera--sardina diagrama del proceso del recorrido S-5" (Canning technique--sardine flow-chart S-5), article, Industria Conservera, vol. 31, no. 312, June 1965, pp. 160-161, printed in Spanish. Industria Conservera, Calle Marques del Valladarea, 41, Vigo, Spain.

SPINY LOBSTER:

"Economy of Western Australian crayfishery--prosperity depends on U. S. A. market," by D. J. Barker and T. H. McClelland, article, Australian Fisheries Newsletter, vol. 24, no. 11, November 1965, pp. 24-26, illus., printed. Fisheries Branch, Department of Primary Industry, Canberra, Australia.

Articles from Boletín de Estudios de Pesca, vol. 3, 1963, illus., printed. Boletín de Estudios de Pesca, Rio de Janeiro, Brazil:

"Contribuição ao estudo sobre as variações de produtividade das pescarias de lagosta na costa oriental do nordeste Brasileiro e flutuações na composição dos desembarques na praia do Pina (Pe)" (Studies of the variation in productivity of the spiny lobster fisheries of the east coast of Northeast Brazil and fluctuations in the composition of landings on Pina beach--Pernambuco), by Soloncy J. C. de Moura, no. 9/10, pp. 7-19.

"Variações sazonais na composição biológica dos desembarques de lagostas" (Seasonal variation in the biological composition of the landings of spiny lobsters), by Petrólio Alves Coelho, no. 11/12, pp. 21-32.

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SQUID:

The Structure, Development, Food Relations, Reproduction, and Life History of the Squid LOLIGO OPALESCENS Berry, by W. Gordon Fields, Fish Bulletin 131, 108 pp., illus., printed, 1965. Department of Fish and Game, The Resources Agency, Sacramento, Calif. 95814. (Sold by Office of Procurement, Documents Section, P. O. Box 1612, Sacramento, Calif. 95807.)

STRIPED BASS:

"Migrations of the Atlantic striped bass," by John R. Clark, Michael Westerfield, and Herbert Austin, article, Underwater Naturalist, vol. 2, no. 2, 1964, pp. 5-6, printed. American Littoral Society, Sandy Hook Marine Laboratory, Highlands, N. J.

SWEDEN:

"Forutsagelser rörande skarpsillforekomsten pa Vastkusten" (Predictions concerning occurrence of sprat on the west coast), by Armin Lindquist, article, Svenska Vastkustfiskaren, vol. 35, no. 18, September 25, 1965, pp. 322-323, printed in Swedish. Svenska Vastkustfiskarnas Centralforbund, Ekonomiskottet Postbox 1014, Goteborg 4, Sweden.

TARIFFS:

Tariff Schedules of the United States, Annotated, 1965, TC Publication 183, 653 pp., printed, \$6; plus \$1.50 for foreign mailing. United States Tariff Commission, Washington, D. C., November 4, 1965. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) This volume supersedes the Tariff Schedules of the United States Annotated (1963). It contains the legal text of the Tariff Schedules of the United States, as amended and modified, together with annotations prescribing statistical information to be supplied on customs entry and withdrawal forms with respect to articles imported into the customs territory of the United States. It is designed to enable importers, customs brokers, customs officers and other interested persons to determine (1) the rates of duty applicable to imported articles (includes fishery products), and (2) the requirements for reporting statistical data with respect to such imports. Also includes amendments and modifications made on or after August 31, 1963, and before October 22, 1965.

TARIFF AND TRADE:

Operation of the Trade Agreements Program, 16th Report, July 1963-June 1964, TC Publication 164, 146 pp., processed, 1965. United States Tariff Commission, Washington, D. C. 20436. This report covers events from July 1963 to June 1964. It describes U. S. preparations for participation in the sixth round of multilateral trade agreement negotiations (known as "the Kennedy round") and the status of negotiations at the close of the period. The 21st Session of the Contracting Parties to the General Agreement was held in the spring of 1964. GATT activities of interest to the less-developed countries were among the major topics explored at the session. The Commission's report describes these and other major developments respecting the trade agreements program.

TERRITORIAL WATERS:

An Act, To prohibit fishing in the territorial waters of the United States and in certain other areas by

vessels other than vessels of the United States and by persons in charge of such vessels), by Kenji Itano, No. 9, 38 pp., printed in Japanese. Japan Fisheries Conservation Association, Zenkoku Choson Kaikan Bldg., 1-17, Nagata-Cho, Ciyoda-ku, Tokyo, Japan.

THAILAND:

An Analysis of Demersal Catches Taken from the Experimental Trawling Operations in the Gulf of Thailand, by Sanan Ruamragsa and Andhi P. Isarankura, Contribution No. 3, 72 pp., illus., printed in English, May 1965. Department of Fisheries, Bangkok, Thailand. Main objectives of this analysis were to study catch per unit of effort for demersal fish in relation to the depth of water by area as well as by season; catch composition by species of economical value in relation to the depth of water and to area; and catch ratios of species of economical value to other fish in relation to the depth of water. The analysis also compares the night and day catches; morning and afternoon catches; and presents a tabulation of structures of the sea bottom in various locations throughout the Gulf, including an indication of the places where grounds were found to be unsuitable for trawl fishing.

Export Market Guide to Thailand, 10 pp., printed, 1965, 10 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. 20230.

TRADE LISTS:

The U. S. Department of Commerce has published the following mimeographed trade lists. Copies may be purchased by firms in the United States from the Commercial Intelligence Division, Office of International Trade Promotion, Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. 20230, or from Department of Commerce field offices at \$1 a copy:

Oils (Animal, Fish and Vegetable)--Importers, Dealers, Producers, Refiners and Exporters--Spain, 23 pp., September 1965. Lists names and addresses, size of firms, and types of product (including fish oil) handled by each firm. Also contains trade and industry data (including fish oil).

Canneries and Frozen Foods--Producers and Exporters--Honduras, 4 pp., September 1965. Lists names and addresses, size of firms, and types of products (including fish and shellfish) handled by each firm. Also contains trade and industry data (including fishery products) on production, exports, imports, and export control of canned and frozen foods.

Canneries and Frozen Foods--Producers and Exporters--Hong Kong, 8 pp., October 1965. Lists names and addresses, size of firms, and types of products (including fish and shellfish) handled by each firm. Also contains trade and industry data on production and exports of canned and frozen fish and shellfish.

TRAWLERS:

"Essais d'un nouveau type de chalut équipé d'un dispositif de sélectivité pour la pêche des crevettes," (New type of selective trawl tested for the shrimp fishery), by G. Kurc, L. Faure, and T. Laurent, article, La Pêche Maritime, vol. 44, no. 1051, October 1965, pp. 754-757, illus., printed in French, single copy 15 F. (US\$2.85). La Pêche Maritime, 190 Boulevard Haussman, Paris 8e, France.

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TRAWLING:

Articles from Current Affairs Bulletin, no. 43, August 1965, processed. Indo-Pacific Fisheries Council, Food and Agriculture Organization of the United Nations, Bangkok, Thailand:

"Coastal trawling for prawns and fish," by A. C. J. Weerekoorn, pp. 4-5. Some results of recent trials carried out in Ceylon on trawling.

"Trawling in tropical waters (India)," by K. Chidambaram, pp. 1-3. An account of the trials in Indian coastal waters with trawling from small craft. Discusses research to develop suitable types of gear and presents some catch data.

TUNA:

"Conteúdo estomacal e evolução sexual dos atuns e espécies afins" (Stomach contents and sexual development of tunas and related species), by José Bon G. Fonseca and Silvio B. Maraes, article, Boletim de Estudos de Pesca, vol. 3, no. 9/10, 1963, pp. 3-6, illus., printed. Boletim de Estudos de Pesca, Rio de Janeiro, Brazil.

Ecology and Dynamics of the Skipjack Population, by Tsuyoshi Kawasaki, No. 8, Parts I and II, 108 pp., illus., printed in Japanese. Japan Fisheries Conservation Association, Zenkoku Choson Kaikan, Bldg., 1-17, Nagata-Cho, Ciyoda-ku, Tokyo, Japan.

"Food and feeding habits of skipjack tuna (Katsuwonus pelamis) from the Marquesas and Tuamotu Islands," by Eugene L. Nakamura, article, Transactions of the American Fisheries Society, vol. 94, no. 3, 1965, pp. 236-242, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

UNDERWATER EXPLORATION:

Something Rich and Strange, by Robert E. Schroeder, 191 pp., plus 32 pp. of photographs (some in color), printed, 1965, \$5.50. Harper & Row, Publishers, Inc., 49 East 33rd St., New York 16, N. Y. While seated in your favorite armchair, you can join a marine biologist, who is also a skin-diving enthusiast, in exploring the marvelous life of the sea at night. The remarkable changes between day and night in the waters around coral reefs are revealed in this book. In direct and simple style the author paints word pictures of day and nighttime marine creatures feeding, fighting, and reproducing. Bovine parrotfish crunch coral to obtain algae; shrimp swim in and out of the mouths of predatory fish to remove tiny parasites; spidery arrow crabs fish for worms with long ice-blue claws. Fish-watching and the author's day-to-day adventures in the Caribbean are described vividly. Consisting of two parts, Part I deals with the Virgin Islands and includes these chapters: St. John; Salt Pond Bay; Love Life of the Redfin; Diadema (spiny black urchin of the coral reefs) and Other Monsters; Cosmos of the Lantern; Buck Island; and Of Birds and Jellies. Part II deals with the Florida Keys and includes these chapters: Alligator Reef; Night Creatures of Alligator Reef; Little People of the Reefs; Those Worms in Fish; The Deep Reefs; Matecumbe; Beyond the Reefs. The author also describes the opportunity underwater research offers to man in understanding the underwater environment, and in mining its resources. Scientifically sound and informative,

this book should be of interest to all those who would like to learn more about the mysterious world under the sea. The book has a good index.

—Joseph Pilaggi

U.S.S.R.:

Articles from Rybnoe Khoziaistvo, No. 8, August 1965, printed in Russian, single copy 50 Kopecks (about 56 U. S. cents). Rybnoe Khoziaistvo, V. Krasnosel'skaia 17, Moscow B-140, U.S.S.R.: "New progressive methods in fisheries," pp. 1-3; "The sword-fish," by V. V. Ovchinnikov, pp. 8-11; "Fishery resources of the continental shelf of the Northern Pacific Ocean," by N. P. Novikov, pp. 11-16; "Squids -- a potential resource," by G. V. Zuev, pp. 16-19; "The method of control of mixed diseases of carp yearlings," by A. M. Aligadzhiev, pp. 30-36; "Continued development of fisheries on the high-seas and oceans," by N. M. Saburenkov, pp. 34-36; "A new method of search in commercial exploratory fishing," by A. A. Degtiarev, pp. 36-39; "Electric light fishing for hering and sardines," by I. I. Bagautdinov, pp. 41-44; "Let us pay more attention to the shore-based fishery for marine mammals," by Iu. I. Nazarenko, pp. 49-50; "Efficient utilization of the Pacific halibut," by A. A. Kirillova and P. L. Kantemirova, pp. 53-55; "Commercial and chemical characteristics of the Atlantic scup and its utilization," by V. P. Alexandrovskiy and others; pp. 55-58; "High temperature and multi-stage sterilization of canned fish," by M. S. Aminov and L. I. Skorokhodova, pp. 58-62; "Analysis of the productivity of refrigerated fish carriers," by Iu. L. Korotkov, pp. 72-76; "Determining the net cost of the fishery production must be improved," by I. Anukhin, pp. 76-78; "Methods of determining the standards for simultaneous unloading of fishing boats and the traffic capacity of a fishing port," by A. V. Sorokin, pp. 78-80; "Plant distribution problems in the Caspian fish-processing industry," by V. K. Kiselev, pp. 80-82; "Model vessels of the Azov and Black Sea fishing industry," by N. Ziuz'ko and V. Boichenko, pp. 82084; "Present trends in the world production of fish meal," by V. M. Shparlinskii, pp. 84-87; "Defrosting of fish in moist air current (Survey of foreign sources)," by V. P. Bykov, pp. 89-91; and "The development of marine fishing in Poland," by Menrikh Tetslaf, pp. 91-93.

Research Vessels of Academy of Sciences, USSR, by Ye. M. Suzumov, Technical Translation No. 65-32342, 21 pp., illus., printed, September 2, 1965, \$1.00 (Translated from the Russian, Vestnik Akademii Nauk SSSR, no. 7, July 1963.) Clearinghouse for Federal Scientific and Technical Information U. S. Department of Commerce, Port Royal and Braddock Roads, Springfield, Va. 22151.

UNITED KINGDOM:

"British fisheries changing fast," by H. G. Garland, article, Foreign Trade, vol. 124, no. 9, October 30, 1965, pp. 14-15, illus., printed, 25 Canadian cents. Department of Trade and Commerce, Ottawa. (Sold by Queen's Printer, Government Printing Bureau, Ottawa, Canada.) Reviews changes and experiments in the catching, processing, storage, and marketing of fish in Great Britain.

VESSELS:

"Islands norskbygdde havfiskefartoy topper fangststatistikken" (Iceland's Norwegian-built sea fishing

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boats top the catch statistics), by Mats Wibe Lund, Jr., article, Norges Handels og Sjøfartstidende, March 1965, illus., printed. Norges Handels og Sjøfartstidende, Kogensgate 6, Oslo, Norway.

VITAMINS:

"Content of vitamin A in Liver and intestines of fish from the Bering Sea, and methods for the procurement of raw materials for the manufacture of vitamin A," by G. A. Dolbish, article, Chemical Abstracts, vol. 63, Aug. 16, 1965, Abstract No. 4093g, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

WHALES:

Whale's Way, by Johanna Johnston, illustrated by Leonard Weisgard, 45 pp., illus., printed, 1965, \$2.95. Doubleday & Company, Inc., 277 Park Avenue, New York, N. Y. 10017. Young readers up to six in this book will find an outline of a year in the

life of a humpback whale. They will learn that whales are not fish, but warm-blooded animals; although humpbacks are only medium-sized whales, each weighs five times as much as an elephant; whales' tails are called "flukes"; some whales have teeth and others do not; whales feed on plankton. The book traces a year in the life cycle of the whale--its long migrations to warmer seas, the birth and care of its young; and its play. Also, the distinguishing characteristics of the different types of whales are examined. Children naturally are interested in the sea and the creatures of the sea. To them the watery world is mysterious and conjures pictures of adventure and fantasy. This book will answer any child's questions about whales in simple language but with important details that are of interest as well as of educational value. The illustrations alone will arouse his interest and lead to questions.

--Joseph Pileggi



ALGAE PRODUCED FROM COMBINATION OF SALT WATER AND SEWAGE

A process for producing red algae continuously from a combination of salty water and sewage has been patented by two faculty members of the University of California.

The inventors of the process recommend a lagoon with hard bottom, in which the mixture of sewage and salty water can be contained for several days. Ocean water alone will not produce the algae, the scientists found. However, the addition of sewage or other nitrogen-containing chemicals makes the algae growth "highly successful." The scientists assigned patent rights to the Regents of the University of California. (Science News Letter, August 7, 1965.)

CORRECTIONS

Table 1 - Positions of Bureau of Commercial Fisheries - Atomic Energy Trawling Stations off the Columbia River, Oregon, which appeared on page 2 of the December 1965 issue, should be deleted--it does not pertain to the article, "A Japanese Gill-Net Fishery for Bottomfish in the Gulf of Alaska."

In the October 1965 issue, the article "Pasteurization of Fishery Products with Gamma Rays from a Cobalt-60 Source," page 5 - figure 2 cited in lines 27 and 38 should be figure 2; page 7 - figure 2 cited in lines 13 and 14 should be figure 4.

FISHERY EXPERTS STILL NEEDED FOR TECHNICAL ASSISTANCE IN MANY COUNTRIES

There are many FAO technical assistance projects in nearly all of the developing countries. The following is a December 1, 1965, list of vacancies for which FAO is recruiting. Write (on a confidential basis if desired) to: Roy I. Jackson, Director, Fisheries Division, Food and Agriculture Organization of the United Nations, Viale delle terme di Caracalla, Rome, Italy.

The following list shows the country in which the vacancy exists, the types of fishery experts needed (in parentheses the duration of the assignment in months for the fiscal year 1965/66):

Aden: Biologist (24), 2 Masterfishermen (28 & 26).

Argentina: Marine Biologist (60), Oceanographer (42), 2 Trawl & Purse Seine Technologists (60 & 36), Acoustics Technologist (24), Economist (54).

Brazil: Fishery Training Expert (24), Planning and Statistics Expert (24), Policy and Institutions Expert (24).

Ceylon: Fishing Gear Technologist (12).

Congo (Brazzaville): Marine Resources Survey Project Manager (36).

Cuba: Fishing Gear Technologist (5).

Ghana: 3 Pelagic Biologists (53, 48, & 42), Demersal Biologist (46), Gear Technologist (48), Masterfisherman (54).

India: Fish Processing Technologist (6), Fishing Harbor Survey Project Manager (36).

Iran: Inland Fisheries Biologist (6).

Malaysia: Fishery Development Adviser (12).

Mexico: Fishery Development Adviser (12), Marketing Economist (12), Masterfisherman (18).

Nigeria: Masterfisherman (12), Fishing Gear Technologist (17), Lake Kainji Economic Dev. Project Manager (72).

Pakistan (East): Biologist (60), Fish Processing Technologist (36), Marketing Economist (48), Statistician (36), Marine Engineer (12).

Peru: Marine Resources Survey Project Manager (48).

Philippines: Fish Processing Technologist (24), 2 Marketing Economists (48), Naval Architect Technologist (30), Statistician (12), Masterfisherman (27).

Senegal: Fishing Gear Technologist (9), Marine Resources Survey Project Manager (60).

Sierra Leone: Marine Resources Survey Project Manager (60), Marine Biologist (12).

U.A.R.: Lake Nasser Economic Dev. Project Manager (60).

Uganda: (Lake Victoria): Limnologist (48), Statistician (24), Masterfisherman (36), Costing Economist (24).

Caribbean: 3 Masterfishermen (36).

Central Africa: Inland Fisheries Project Project Manager (60).

Central America: Marine Biologist (33), Economist (48), Masterfisherman/Fishing Gear (47), Technologist and Methods Expert (47), Technologist (48), 2 Fish Processing Technologists (30).

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HIGHLIGHTS IN THIS ISSUE (FEBRUARY 1966)



Features

TRAWL COD END MESH SIZE SELECTIVITY TOWARD YELLOW PERCH IN LAKE ERIE--analysis of gear study for profitable catch rate (p. 1).

SKIPJACK TUNA (KATSUWONUS PELAMIS) RESOURCES OF THE TRUST TERRITORY OF THE PACIFIC ISLANDS--prewar catch rate used as index to potential fisheries (p. 6).

Trends in the United States Fisheries

ANCHOVY--California experimental fishery approved (p. 13).

FISHERIES LABORATORY--New tropical Atlantic laboratory at Miami, Fla. (p. 17).

FISH MEAL--When added to diet, swine grow faster (p. 21).

GEAR--Nekton ring net sampler for use aboard oceanographic research vessels--Equipment Note #18 (p. 9); trawl that sorts shrimp and fish to be tested (p. 13); pelagic gear research (p. 27).

MENHADEN--Review for 1965 (p. 23).

NAUTICAL CHARTS--Lists for Atlantic and Gulf coasts of United States (p. 25).

OCEANOGRAPHY--New Institute set up within U. S. Department of Commerce (p. 29); stable buoy, *Sea Spider*, installed off South Carolina (p. 31).

OREGON--Fish Commission changes fishing regulations (p. 32).

OYSTERS--Supplemental feeding tested (p. 34).

TUNA--Record size albacore caught (p. 39).

WASHINGTON--1963-1964 landings of fish and shellfish (p. 41).

Reports on Foreign Fisheries

BULGARIA--Trawlers to be built for domestic and Soviet fisheries (p. 52).

CANADA--Federal Government to assist fishermen for catch failures (p. 52).

EUROPEAN FREE TRADE ASSOCIATION--Reduces industrial tariffs another 10 percent (p. 46).

FRANCE--Holds International Conference on cod industry (p. 45).

JAPAN--Promotion launched on tuna canned in oil (p. 64); new tuna trolling gear developed (p. 65); views on fisheries agreement with South Korea (p. 69).

MAURITANIA--Spain to build fish-processing complex (p. 74).

TUNISIA--Swedish loans aid fisheries development (p. 82).

U.S.S.R.--Japan launches fifth in series of factoryships for Soviets (p. 84).

UNITED ARAB REPUBLIC--Soviet-Egyptian fishing agreement signed (p. 84).

Federal Actions Affecting Fisheries

DEPARTMENT OF COMMERCE--To aid Lake Superior commercial fishing industry (p. 87).

DEPARTMENT OF THE INTERIOR--Evaluating coating requirements for frozen raw breaded shrimp (p. 88).

Plus

Marketing and industrial products reports; State actions affecting fisheries; and reviews of recent fishery publications throughout the world.

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